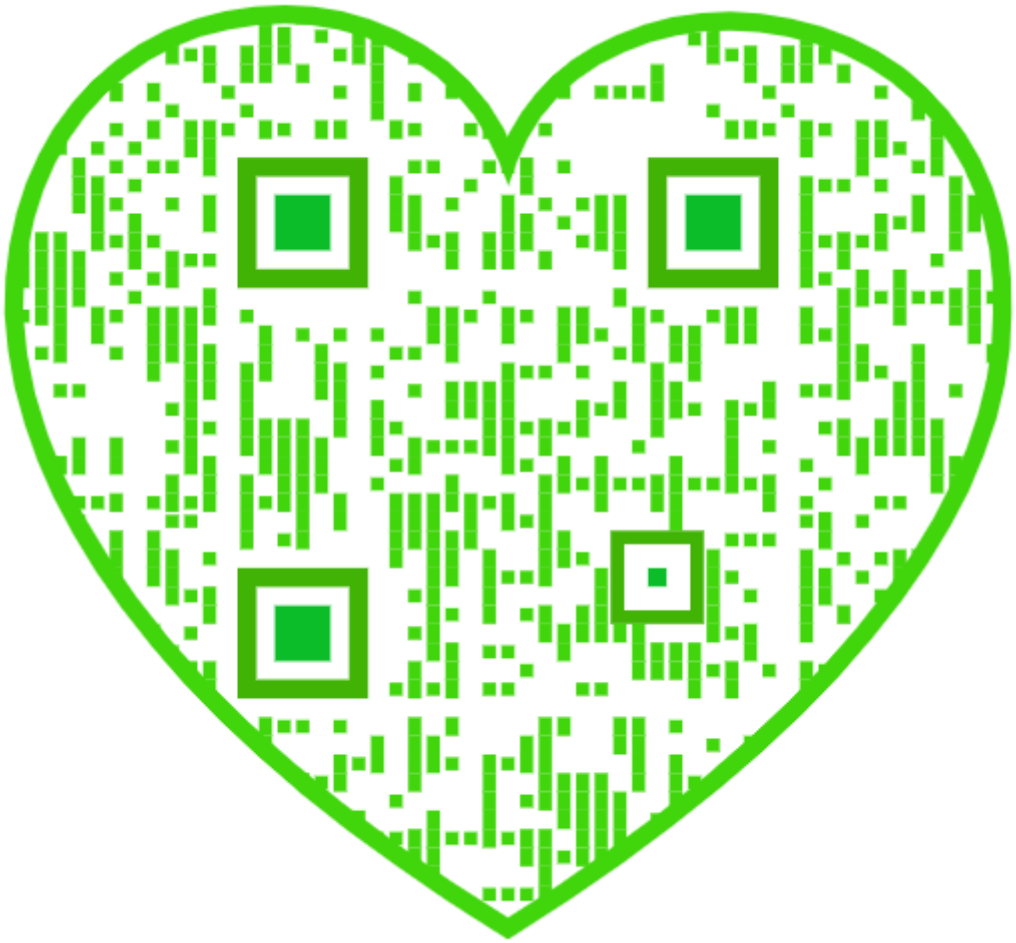
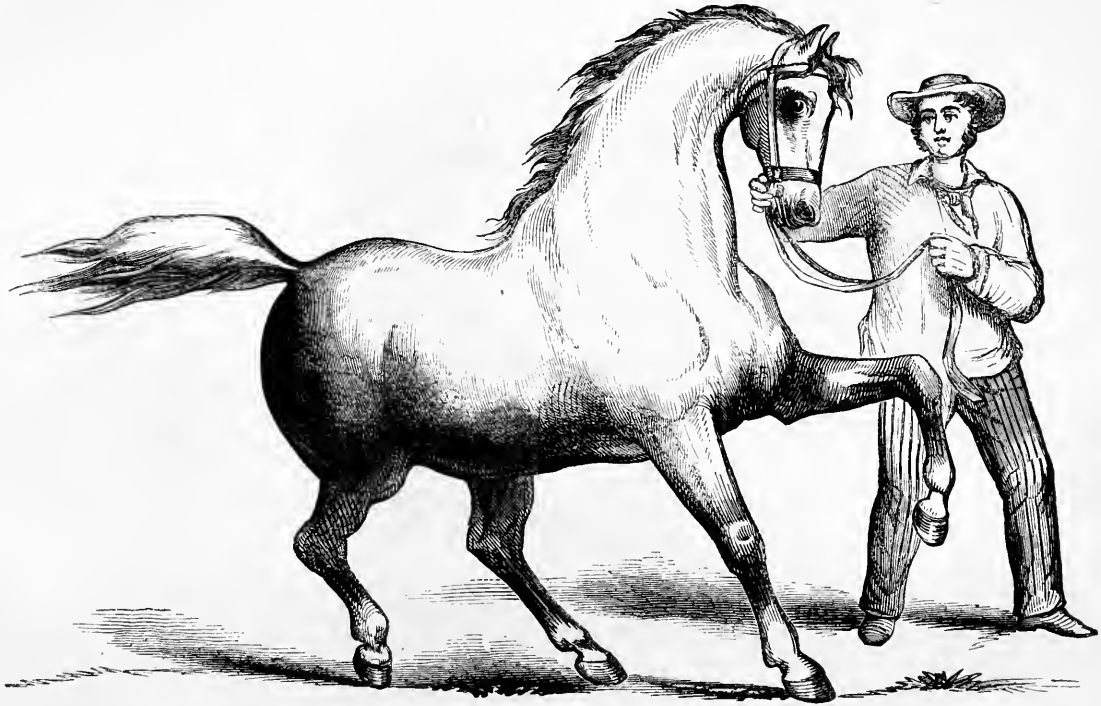
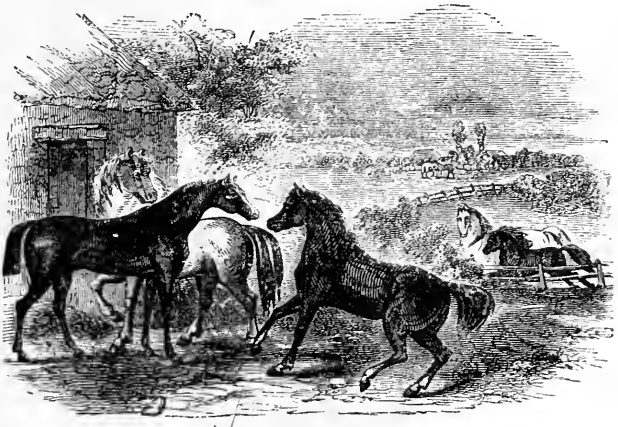




THE AMERICAN FARMER'S

HORSE BOOK;

Embracing, in ADDITION to the subjects USUALLY treated of in similar works; A FULL DESCRIPTION of the Causes and Nature of Several Diseases PECULIAR to the AMERICAN HORSE; together with ORIGINAL, SIMPLE and EFFECTIVE Modes of Treatment, INCLUDING those of some DISEASES HERETOFORE CONSIDERED INCURABLE; and also, An Extended Treatise on STOCK RAISING and STOCK MANAGEMENT. The whole ESPECIALLY ADAPTED to the USE of the FARMER.



BY ROBERT STEWART, M. D., V. S.

EMBODYING

The Results of TWENTY YEARS ORIGINAL INVESTIGATION and Veterinary Practice.

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PUBLISHERS' PREFACE.

As this work goes to press, the author is confined to his bed with a painful and protracted sickness, rendering him unable to write a preface. Were he able to do so, however, he would not be called upon to make an apology for the issue of such a work. It needs no apology. It meets our most sanguine expectations, and we feel sure it will receive the warm approbation and cordial support of those interested in the horse and mule.

The work had a *natural* origin, and a slow, healthy growth and development, arriving at *full maturity* before being sent forth to the world. The author commenced the study of the subject some twenty years ago, for the purpose of discovering rational modes of treatment for *Fistula* and *Big Head*, which were making fearful ravages among his own stock, the only modes of treatment known being the barbarous and, to a great extent, *ineffectual* ones, *still* in *general practice* in many localities in the Valley of the Mississippi. At the time, he had no idea of pursuing the subject further, but the complete success that crowned his efforts in the treatment of his own stock and that of his neighbors, who pressed him into the service, created a thirst for a *general* and minute knowledge of all the diseases the horse is heir to, and led him to abandon all other pursuits, and give himself up to study and original investigation, which led to a very wide and highly successful veterinary practice, completely demolishing many old theories, and superseding the harsh, cruel, and inhuman modes of treatment generally practiced, by those more effectual, cheaper, simpler, and in every way

better. His practice was chiefly in the great stock-raising regions of Tennessee and Mississippi, but extended all the way from the Ohio to the Rio Grande.

This book is the result, and we put it forth in the full confidence that it will more fully meet the wants of *American* horse-owners and managers than any other, or *all* other, works extant. It is *distinctively American*, treating more fully and explicitly of the diseases *peculiar* to the *American horse*—more especially those peculiar to the Valley of the Mississippi—than any other work hitherto published. It is written in plain, simple language, that any one can understand with the aid of the Glossary of Technical and Scientific Terms, and will be found *peculiarly* adapted to the use of the *farmer*. We send it forth on its *merits*, and have no fears but what it will *stand* there.

Those who may use it will confer a favor by communicating to us, by letter, the results of their experience. We shall thereby be enabled to detect and correct any errors that may have crept in, or that may occur on the part of those using the book.

THE PUBLISHERS.

Cincinnati, January 1, 1867.

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AMERICAN FARMER'S HORSE BOOK.

CHAPTER I.

BRIEF HISTORY OF THE HORSE.

GENERAL PRINCIPLES KEPT IN VIEW IN THIS WORK—REMARKS ON CROSSING, ETC.

THE horse is a native of several districts of Asia and Africa; and in the Southern parts of Siberia large herds of these animals are occasionally seen. In Ukraine, where wild horses are often found, they are rendered no otherwise serviceable to man than as food. The wild horses on each side of the Don are the offspring of the Russian horses that were employed in the siege of Asoph, in the year 1697, when, for want of forage, they were turned loose. They have relapsed into a state of nature, and have become as shy and timid as the original savage breed. The Cossacks chase them, but always in the winter, by driving them into the valleys filled with snow, into which they plunge, and are caught. Their excessive swiftness is such as to entirely exclude every other mode of capture.

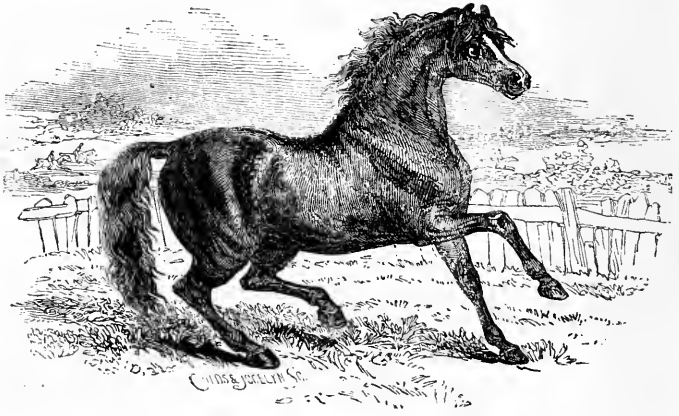
The horses of South America are of Spanish origin, and entirely of the Andalusian breed. They are now become so numerous as to live in herds, some of which are said to consist of ten thousand.

The horse, in a domesticated state, is found in almost every part of the globe, except, perhaps, within the Arctic Circle; and his reduction and conquest is generally considered as the greatest acquisition from the animal world that the art and

industry of man have ever made. In our opinion, however, the sheep should be ranked first in usefulness, the kine second, and the horse third.

Of the six ascertained species of horses, only one has yet been discovered on the New Continent in a perfectly wild state, and this animal has cloven hoofs. It is an inhabitant of the mountains of South America.

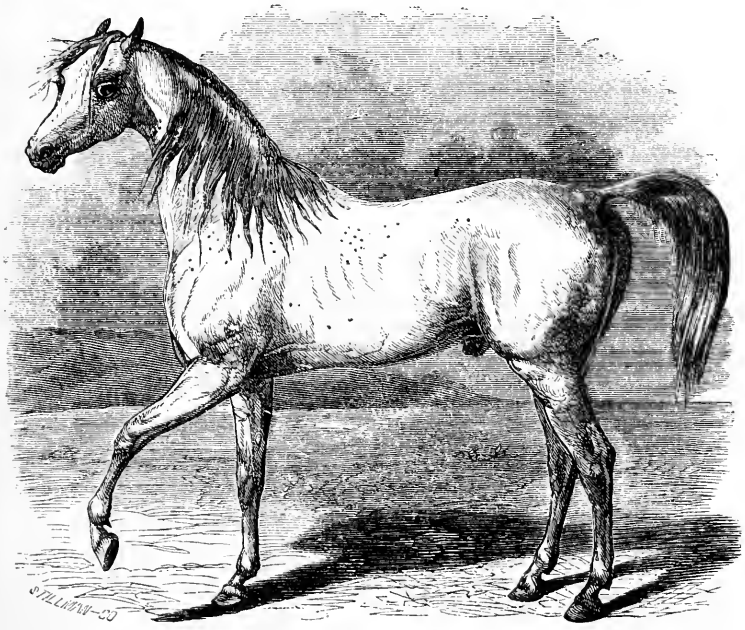
The horse is a type of man—of man's pride, vices, and infirmities, no less than of his independence and strength. His martial traits, especially, have been the theme of glowing description and eulogy in all ages. The unthinking horse that rushes to battle is but the truthful representation of his great prototype—man. The description of the Eastern horse in the book of Job is exceedingly poetical and expressive:



"Hast thou given the horse his strength? Hast thou clothed his neck with thunder? Canst thou make him afraid as a grasshopper? The glory of his nostrils is terrible. He paweth in the valley, and rejoiceth in his strength; he goeth on to meet the armed men. He mocketh at fear, and is not affrighted; neither turneth he back from the sword. The quiver rattleth against him, the glittering spear and the shield. He swalloweth the ground with fierceness and rage; neither believeth he that it is the sound of the trumpet. He

saith among the trumpets, Ha! ha! and he smelleth the battle afar off, the thunder of the captains, and the shouting."

The exultant song of Miriam, after the passage of the children of Israel through the Red Sea, is the second place in the Bible where reference is made to the horse. In her impassioned recital of the glorious triumphs whereby the Lord had wrought such deliverance for his people, not the least was that "the horse and his rider hath He thrown into the sea."



DARLEY ARABIAN.

The horse is nearly always associated in Holy Writ with man, as possessed with the spirit of war, and of great fondness for its conflict and carnage. He, like man, requires, and is capable of, great cultivation and discipline for the murderous and guilty pursuit. Associated with man in his sins, he has been cursed, like him, with his diseases—the sure and certain consequences of sin. It may be said of both his phys-

ical structure and his disorders that they place him nearer man than do those of any of the other beasts of the field.

The history of the horse affords us no evidence that there has been any improvement in the race since Pharaoh and his hosts of horsemen and chariots were overthrown in the Red Sea. The Arabs have always had the finest horses in the world, and their great affection for them has been most remarkable. Among no people has the art of breeding and training the horse been carried to such perfection as among the wandering tribes of the desert; and nowhere else has there been such freedom from disease, unless it be among the ponies of the Western Indians. It does not, then, require intelligence nor cultivation to have good horses, or even the best. And whether the horse has advanced in improvement since the earlier ages, he certainly has become much more subject to disease, and much more so in those countries where the greatest efforts have been made for the improvement of fine breeds. Among the horses of England and France there is three times as much disease as in America, and ten times more in the older States than among the wild horses of the plains of Texas, or the Indian ponies. Both disease and degeneracy have kept pace with the efforts of stable breeding and management.

But few persons are aware that on these plains are to be found some of the finest horses in the world—in size and form and motion—some of them of the most perfect symmetry and models of beauty, and possessing all the varied movements of gracefulness and agility characterizing the horse trained under the most careful supervision, and often in a much more perfect degree.

Said an old Texan ranger to the author, as they were riding together across the great prairies, "Have you heard

the story of that wild pacing mare?" And he proceeded to relate that, on the plains south of San Antonio, there had often been seen, in one of the droves of wild horses so common there, a beautiful cream-colored mare, that never broke her pace, however hard pressed; and that no horse had ever been found of sufficient bottom to overtake her, although she had been often seen, and the trial made. I afterward heard others speak of her, and that such was her rapid pacing that she could not be caught.

One striking peculiarity of the wild horse of the plains, and one that interests us more in this work than any other, is that hinted at above, his almost entire freedom from disease. Could we learn the cause of this exemption, we might do well to imitate the example of these dumb instructors; and nothing in the history of the horse could be of more interest or benefit than to learn this fact. We discover two causes of disease among the horses of civilized life—the diet, the food of the stables, and the abuse he receives from his master—man. The wild horses are free from both, and, with the exception of death from the borer-fly, or from accident, they nearly all die with old age; and some of them live to a great age. They take exercise as Nature requires, and are governed by its instincts. Their food is the wild grass of the prairies, and their drink is from the clear water brook. They visit often the salt licks, with which the country everywhere abounds; and their simple life is one of almost entire freedom from disease, and in which their natural capacities are developed in their greatest perfection and strength. We could recommend no better veterinary course of study than a trip to the plains, and an acquaintance with the manners and habits of the wild horse, and their beautiful symmetry of form and movements, the last of which has been compared by one,* who has given a description of them, to excel the best-trained cavalry in the world. The student would come back with his mind thoroughly disgusted with the vile practices

*Washington Irving.

of the stables and the farms—the homes of the horse among civilized man.

In England, for the last two or three centuries, the rich and noble have been engaged in improving the breeds of horses, and bringing out all their fine qualities; and during all this time he has improved backward—has actually degenerated—gone back a hundred years; and, with the exception of a few, gathered from all parts of the land in the stables of rich and noble gentlemen, he is not to day what he was in the days of Charles I. and Oliver Cromwell. And if we are to take the statements of the most learned and reliable English authors upon the horse, there has been a very great falling off in the last fifty years, more than at any former period. We refer to the statements of Mr. Castley, and of Youatt in his work on the horse, pp. 248–9. This is the condition of the farmer's horse: A very few fine horses are to be found among the rich, who gather them up from all parts of the land; and the number of these have become so few, and are held at such enormous prices, that the farmers can not procure them at all. And many a rich gentleman in England may be seen riding a horse now not so good as the common farmer rode to his fair fifty or a hundred years ago. It used to be common for the old English farmer to ride his fine blooded horse to the fair, but that day has passed. All such have been appropriated by the rich and great, and so poorly has the supply kept pace with the demand, that there is not near enough to meet it, and the disparity is becoming greater every year.

This is the case, also, in Spain. In the days of Spanish chivalry, the Andalusian horse was the finest and noblest the world has ever seen, and the crusader was mounted upon the noblest steed that ever trod the soil. But what are the Andalusians now? Mere ponies. Their former greatness is gone. They possess no points of resemblance of former days. They were collected from their native hills and valleys to the haunts and service of civilized man, and they have sunk into obscurity and almost extinction from the earth.

Such ever has been, and such ever will be, the history of the domesticated horse. New races are produced by breeding and mixing the different races, yet not more than one out of five will be an improvement of a medium of the two, and the others will fall far below it, and, in combination of bloods, the days will be shortened and the infirmities increased.

In our own country the same law governs, and may be seen to a large extent. But his treatment is so much better, and on our farms he is so much nearer his natural condition, that the same evil results are not seen. Yet the horse of the present will not compare with those of the days of the Revolution. The history of the late terrible war proves this but too plainly. The qualities of the cavalry horse of the present, and his powers of endurance, in comparison with those of McDonald and Marion, are largely in favor of the revolutionary times. We have many fine horses in our country, and many of these are among the farmers, but is the general character of the horse what it was in former times? It certainly is not. Many of the horses are larger now, but they are generally coarser, more flabby and loosely made, and do not possess the compactness of form or the powers of endurance of the horse of the last century, and, from some source, a fountain of disease has sprung that is deluging our land with its dreadful virus, and disease and degeneracy are terribly on the increase. From whence does this all come, and what has caused it? are questions that interest the historian of the horse, and should be made a part of his record, as it properly belongs to his department.

We introduce a short account of a very remarkable race of horses, as given by Mr. J. S. Skinner, formerly Assistant Postmaster at Washington City. They are "very small, compact, hardy horses, called beach horses, on the islands along the seaboard of Maryland and Virginia. They run wild throughout the year, and are never fed. When the snow sometimes covers the ground for a few days in winter, they dig through it in search of food. They are very dimin-

utive, but many of them are of perfect symmetry and extra ordinary powers of action and endurance." One served as a pony for the boys of a family of Accomac for several generations; another could trot his fifteen miles in the hour; still another that it was believed could trot his thirty miles in two hours."

This account has been introduced to prove still more clearly what has been already stated in connection with the wild horse of the plains, that man has never accomplished, with all his plans and schemes of improvement of Nature's work, what Nature is constantly doing in the same department, unassisted by him.

Man has been trying, in all ages of the world, to do Nature's work; has interfered with her laws, and tried to control her action. And Nature has been, when obstructed, silently at work, far outstripping him, and showing a perfection of beauty, of symmetry, and power that puts to shame and rebukes the madness of the prophet, and exhibits so clearly the weakness of man and his folly.

Whenever man undertakes to do the work of the Creator, he mars its beauty and excellency, and introduces discord and death as the result of his patch-work.

The beach horse is the Canadian pony breed, originally from the south of France, and is of the same race as the Indian pony. The wild horse of the plains is of the old Spanish stock and the pure Andalusian, propagated and improved by Nature's in-and-in during hundreds of years. The fine bloods of England and America are crosses of the Arabian with several others, and none of them come near equaling the original. Many an Arab of the desert can sell his mare or horse for two and three thousand dollars, and a stallion from the cavalcade of one of the more powerful Sheiks will bring almost fabulous prices.

A fine Andalusian may be met with occasionally in this beautiful valley in Spain, but Spanish in-and-in crossing of a former age has nearly destroyed the race. The pure races far exceed in longevity any of the mixed breeds. The pony

will last three times the life of the American horse. The wild rover of the plains lives to twice his age. The Arabian often lives to thirty and even fifty years, with his vigor but little impaired. The Indian pony has been known to live fifty and sixty years. The American or English horse will not average fifteen.

The history of in-and-in breeding, and the crossing of *different races*, is the history of disease and deterioration. The evils arising from these practices are untold and unimaginable. It was never designed to be so. While there is no law of incest in the brute creation, it is unquestionable that great evils result both from mingling the blood of members of the same family, and, also, that of the separate and distinct races, the same as in the human family. The pure races have ever been superior to the mixed. There is an awful curse resting upon the amalgamation of the races in the human family, and it applies to man in his mismanagement of the brute creation. It is assigned in the Bible, by Ezra, the prophet, as the cause of the banishment and captivity of the Jews, "and as a great trespass in the sight of the Lord," and one that must be put away to bring again the favor of the Lord. And he says, "When I heard this thing, (the mixing of the holy race with other races,) I rent my garments and my mantle, and plucked off the hair of my head and of my beard, and sat down astonished." And so will every intelligent physiologist sit down astonished at the folly and ignorance, and, more so, of the great wickedness of those who would thus subvert Nature's laws and destroy the great ground-plan of creation and Providence by an intermingling of the different races in either man or beast. God, in his wisdom and goodness, after an experiment and a failure of one race upon the earth, sent them out again, different races of all animate creation, to fill the earth, and yet to be kept entirely separate from each other, and giving to each a law of instinct or reason to govern them in their habits and propensities; and when these laws are obeyed, blessing and prosperity attends; but when disregarded, the consequence is a blighting curse. Our object

should be to study this great law of our physical being, and also in the brute creation, and to labor for the improvement of the different races, not the formation of new ones. Such will be our purpose in the future pages of this work.

It is not our design to enlarge upon these topics in this very brief outline of history, but in their appropriate chapters they will be more fully presented. It is with the horse as we find him in America that we have to do in this work. Not the general history of his races, pedigrees, and performances, but the history of his diseases, their causes and cures, and rational and generous rules for his treatment and general improvement.

GENERAL PRINCIPLES KEPT IN VIEW IN THIS WORK.

Certain leading principles, already indicated in this chapter, have been constantly kept in view in the preparation of this work. An epitome of these will probably prove of material assistance to many readers, and, as it will occupy but little space, is here introduced:

1. The horse is naturally a wild animal, his condition of domestication being really one of slavery.

2. His wild or native state is that in which he is the most free and happy, and that in which he lives the longest and attains the most perfect development of his natural powers.

3. Like the human family, the species was originally divided into distinct races, which races Providence designed should be kept separate forever.

4. In their wild state, the different races, dispersing in droves, do not mingle together, and if they were left to follow the instincts of nature, intermixture would never occur.

5. The horse is not naturally a diseased animal. He is subject to extremely few hereditary disorders, or, perhaps, to none; but indiscriminate commingling of blood has fearfully multiplied the diseases to which he is subject, and occasioned deplorable degeneracy.

6. Improper treatment and abuse at the hands of man

have been the causes of nearly all his diseases, and of his great decay as regards longevity and natural capabilities.

7. The horse is improved and becomes more efficient as his circumstances are brought nearer his condition by nature, and as his wants are better understood and supplied.

IMPORTANT FACTS TO BE REMEMBERED IN TREATING DISEASES OF THE HORSE.

1. The horse is more like man, as regards general structure and the pathology of his diseases, than any other animal.

2. As a rule, though not without some exceptions, the causes of disease in man operate similarly upon the horse, and the same remedies are equally efficacious for both.

3. Disease is either general or local in its character: local when only some particular organ or part is affected; general when the whole system is involved.

4. Nearly all disorders of both man and beast, whatever may have been the primary or external causes, proceed from obstruction and derangement of the circulation and secretive functions. Therefore, to keep in health, prevent these obstructions; to restore to health, remove them.

5. Although disease does not originate in the blood, this is the medium by which it is transmitted throughout the general system.

6. One of the functions of the nervous system is to assist in propelling the blood through the veins and arteries. Hence, any derangement of the nerves affects the circulation, and *vice versa*.

7. The size of the horse is ten times that of man. His organism is coarser, and the vessels of his system are larger in proportion. When medicines are administered, they must be of corresponding strength.

8. Compared with man, the horse breathes only half as fast. The same is true in respect to the rate at which his pulse beats and his blood flows.

9. Disease usually develops itself, and likewise abates, much more slowly in the horse than in man.

10. All medicines are not uniform in their action upon different animals. Some substances which are poisonous to man are quite harmless to the horse. The reverse is also true.

11. The fewer the medicines given the horse, provided the cure is effected, the better. Thousands of valuable animals are killed yearly by excessive drenching.

12. Nature can not be forced, but may be assisted and relieved; and to accomplish this there must be an adaptation of the treatment to the nature of the disease.

13. As no effect can exist without adequate cause, whenever disease is detected, we may be sure that its sources are not far remote. Whatever these may be, no time should be lost in tracing them out, and in removing them, if it is possible to do so.

14. Great as is the disadvantage under which the veterinary practitioner labors, from the fact that the sufferer can not speak, it is compensated in great degree by the expressive actions of the animal; and treatment of the horse may always be undertaken with greater hope and confidence than that of the human patient, because it may be made, with perfect safety, much more vigorous and decided.

CHAPTER II.

OUTLINE OF THE STRUCTURE OF THE HORSE.

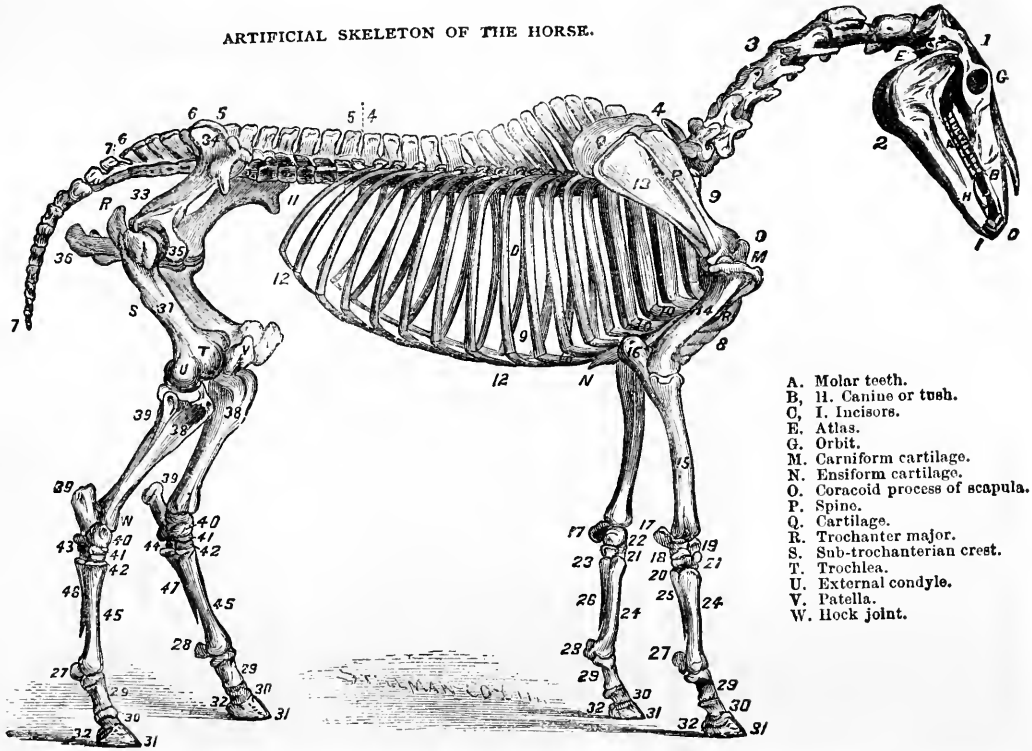
In discussing this subject, we propose to depart from the method usually followed by anatomists in their divisions, classes, and descriptions, and to present the whole subject briefly in one distinct, connected chapter, and in its natural, consecutive order. The classification of the horse among other animals in natural history, and his relations to them, are matters of no practical moment to the farmer and stock dealer. To them the subjects of chief importance are the horse's own peculiar history; his adaptation to the service of man, and the best modes of training him and fitting him for that purpose; the general laws of health, and the means of its preservation; and the diseases to which he is subject, with their proper treatment, and means for their prevention as well as cure. It will be sufficient, in a work like this, to communicate a general knowledge of his structure, so that, in the treatment of disease, the part affected may be readily known, and the remedy intelligently applied.

Our plan of discussion will be similar to that of the carpenter in building a house, which concerns, first, the frame-work; next, the braces and pins that hold it together; then the covering, and, lastly, the inside finish. In the same manner, we will consider, first, the bones, which constitute the frame-work of the horse; next, the muscles and tendons—the braces which fasten the former together; then the skin and hair, the horse's covering; and, lastly, the internal finish—the entire vascular arrangement of lungs, heart, intestines, urinary organs, blood-vessels, capillaries, and pores, with the whole glandular and nervous structure.

Our limits allow, and our purpose requires, but a short

ARTIFICIAL SKELETON OF THE HORSE.

1. Cranium.
2. Lower jaw.
3. Cervical vertebræ.
4, 4. Dorsal vertebræ.
5, 5. Lumbar vertebræ.
6, 6. Sacrum.
7, 7. Coccygeal vertebræ.
8. Sternum.
9, 9. True ribs.
10, 10. Cartilages of true ribs.
11, 11. False ribs.
12, 12. Cartilages of false ribs.
13. Scapula.
14. Humerus.
15. Radius.
16. Elbow.
17. Os pisiforme.
18, 19, 20, 21, 22, 23, } Carpal bones.
24. Large metacarpal bone.
25. Outer small metacarpal bone.
26. Inner small metacarpal bone.
27, 28. Sesamoid bones.
29. Os suffraginis.
30. Os coronal.
31. Os pedis.
32. Wing of pedal bone.
33, 34, 35, 36. Os innominatum.
37. Femur.
38. Tibia.
39. Os calcis.
40. Astragalus.
41, 42, 43, 44. Tarsal bones.
45. Large metatarsal bones.
46. Outer small do.
47. Inner small do.



A. Molar teeth.
B, H. Canine or tush.
C, I. Incisors.
E. Atlas.
G. Orbit.
M. Carniform cartilage.
N. Ensiform cartilage.
O. Coracoid process of scapula.
P. Spine.
Q. Cartilage.
R. Trochanter major.
S. Sub-trochanterian crest.
T. Trochlea.
U. External condyle.
V. Patella.
W. Hock joint.

space for the discussion of each of these divisions. We begin with the general frame-work. In this division, although a minute description of each part is foreign to our purpose, we present the engraving of a very perfect skeleton, accurately indexed for reference or investigation.

The skeleton is composed of two hundred and forty-seven separate bones, which are united by joints to form the spine, thorax, pelvis, tail, and fore and hind extremities. The spine is finished anteriorly by the head, which is divided into the cranium, or skull, and face, and contains the teeth. Suspended from the head is the os hyoides (bone of the tongue), which completes the number of bones; thus:

The Spine consists of 7 cervical, 18 dorsal, and 6 lumbar vertebræ. Total	31
The Thorax is made up of the dorsal vertebræ, with 18 ribs on each side, and the sternum in the middle. Total	37
The Pelvis comprises 2 ossa innominata (or illium, ischium, and pubes), and 1 sacrum. Total	3
The Tail contains, on the average, 17 bones. Total	17
The Fore Extremity is made up on each side of the scapula, humerus, os brachii, and 8 carpal bones; 3 metacarpal, os suffraginis, os coronæ, os pedis, os naviculare, 2 ossa sessamoidea. Total on both sides	40
The Hind Extremity has the femur, patella, tibia, fibula, 6 tarsal bones, 3 metatarsals, os suffraginis, os coronæ, os pedis, os naviculare, 2 ossa sessamoidea. Total	38
Bones of the Cranium	10
Bones of the Face and Lower Jaws	18
Teeth	40
Bones of the internal Ear, four in each organ	8
Os Hyoides, or Bone of the Tongue, made up of five sections	5
Grand total	247

The hoofs are the mud-sills of the frame-work, each holding—coffin-like—within its cavity the coffin-bone (os pedis), which is the first bone in the leg. Next above this is the lower pastern-bone, in front resting upon the coffin-bone firmly and closely, but with an opening at the back, which admits a small bone, of a peculiar shape, called the navicular—literally, ship-shaped—or shuttle-bone (os naviculare).

This extends backward, and forms the projection of the heel. Next in order is the upper pastern-bone, upon which rests the shank-bone, with the sessamoid bone, which articulates with the ankle-joint, and laps over the point of junction of the shank and upper pastern-bone. The knee-joint is composed of seven bones. Sometimes a small, floating bone is found at the back of the joint, making eight in all. Back of the knee, and just below it, is a small, thin bone, extending down the front shank nearly its entire length, and denominated the splint-bone of the fore-leg. Above the knee is the main bone of the leg (the radius), known among horsemen as the arm. It is the longest and largest bone of the fore-leg. Above the arm is a bone of peculiar shape, named the ulna (elbow). Still higher up is the humerus, the upper bone of the arm, sometimes rather vaguely termed the shoulder-bone. This completes the bones of the fore-leg.

Fig. 1. *Fig.* 2.

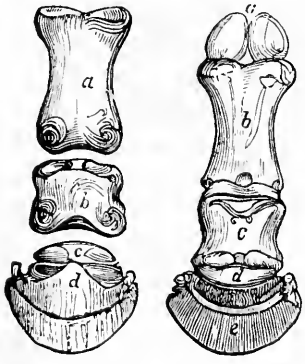


Fig. 1.

a The upper pastern.
b The lower pastern.
c The navicular bone.
d The coffin-bone.

Fig. 2.

a The sessamoid bone.
b The upper pastern.
c The lower pastern.
d The navicular bone.
e The coffin-bone, with the horny laminæ.

In the hind leg, the bones are precisely similar, until we reach the hock-joint, which is composed of six bones. The shank of the hind leg has two splint-bones, while the fore-leg has but one. The point or projection of the hock is called the os calcis, or heel-bone. Above this is the tibia, (flute, or pipe-bone,) the largest bone of the whole structure. Behind this, and fitting closely to it, is a small bone called

fibula (signifying a clasp, or buckle). The stifle-joint is formed by the tibia and the femur, or thigh-bone, which is next above. It is covered in front by the patella, or knee-pan. The six bones of the haunches, or hips—three on each side—complete the bones of the hind limbs. Upon the four legs, which serve as posts, rests the superstructure.

Next may be mentioned the bones of the head. The most noteworthy of these are the superior and inferior maxillaries, the upper and lower jaw-bones. In these are set the teeth: 24 molars, or grinders—6 on each side, both above and below; 12 incisors, or front teeth—six above and six below; and 4 canine teeth, or tushes—one on each side, above and below.

The bones of the skull are thin plates, curved so as to give the head its shape, and locked together by saw-like or dove-tailed edges, to prevent displacement. The principal ones, from their several positions, are respectively called the frontal, nasal, and occipital (eye) bone. Underneath the two former are innumerable little scales of bone, some of them entirely unconnected with the others, but most of them united to the several bones of the head. These are so arranged as to form many irregular cavities, technically designated *sinuses*.

On the top of the head, and at the beginning of the neck, is a double and yet united bone on each side—the temporal bone—to which the first bone of the neck (the atlas) is attached by that peculiar ligament, commonly known as the whit-leather, which is found nowhere in the whole body except here and at the top of the shoulder. It is in this ligament that poll-evil and fistula have their origin.

Here begins the line of the vertebræ forming the spine. This consists of thirty-one bones, linked together by lock-joints. The seven joints of the neck are called the cervical vertebræ, and those of the back proper, the dorsal vertebræ. The latter are eighteen in number, each having an upward projection, varying in length at different parts of the back. At the shoulder this projection is never less than three inches, and in some horses is as much as four or five. It becomes less toward the middle of the back, at which point

it is not more than from an inch and a half to two inches in length. The six lumbar vertebræ, or bones of the loins, comes next, and complete the spine proper. The spinal column, however, is continued by the sacrum, (literally, the sacred bone,) and the bones of the tail, whose number is not uniform in different animals, but averages about seventeen. The main bones of the hip unite with the spine and sacrum at the termination of the lumbar vertebræ.

Many anatomists, among whom is Youatt, adopt a slightly different classification in regard to the bones of the spinal column. They consider the sacrum to be made up of five bones, which are denominated the sacral vertebræ. Some writers, also, specify fifteen as the average number of bones in the tail.

Upon each side, at the shoulder, is a bone called the scapula, the shoulder-blade. This unites, at its lower extremity, with the humerus, from its articulation with which it spreads out and becomes very thin, with a ridge like the letter "T" running through its middle. It extends upward to the backbone, to which it is united by muscle alone. It is this bone which is the seat of that dreadful disease swinney, or inflammation of the shoulder.

The ribs—eighteen upon each side—are so arranged as to give form and strength to the body, and protect the vital organs from injury. The sternum, or breast-bone, is composed of six or seven pieces, and constitutes the floor of the chest. It is a long, spongy bone, fixed between the ribs on either side, serving as a support for the seven true ribs—the forward ones—which closely articulate with it.

We have thus given a sketch of the horse's entire framework, with all the bones that compose it, and the principal offices they perform. The diseases of the bones will be considered elsewhere.

The bones are classified as the solid, the hollow, and the spongy. The solid are the thin plate-bones, such as are found in the head and the back portions of the jaw, and in some parts of the body. The hollow bones are those of the

legs, the hips, and parts of the jaws. These are the largest and strongest in the body, as they need to be, in order to resist the great strain and pressure to which they are constantly subject. The spongy bones include the ends or heads of all the bones that articulate to form the joints; the entire number of small bones that form the joints; the shoulder-blades, the ribs, and the upper and back portions of the maxillaries, or jaw-bones. The spongy portions are those in which disease and exostosis, or enlargement, nearly always make their appearance.

MUSCLES, TENDONS, AND MEMBRANES.

The entire movements of the body and limbs, with a few trifling exceptions, are effected by the agency of that peculiar substance known in our butchers' shops as flesh, and which is recognized by anatomists as muscular tissue. This constitutes the chief bulk of the soft parts outside the three great cavities of the body (the cranial, thoracic, and abdominal). They possess great power of motion, being composed of numberless little strings, or fibers, each of which has a contractile and elastic power of itself, the whole being so arranged as best to serve the purpose intended. While each fiber has an independent elasticity, it acts, at the same time, in conjunction with all the others in the muscle of which it forms a part, so that their united power becomes very great. This may be realized when we consider that it is they which give to the horse his immense strength. One very noticeable feature in the anatomy of the muscles is the albuminous coating which surrounds each fiber, and thus prevents friction. It fills the interstices throughout the muscle, all whose parts are united and bound together by means of its sticky, waxy qualities, with the strength of "a three-fold cord which can not be broken."

Each muscle terminates in a more solid, compact, whitish substance, commonly called a cord. Such it really is, acting with reference to the joint in the same manner as the cord to a pulley. (See description under heading, The Tendons.)

The muscles possess but a limited degree of sensibility. When the flesh is cut by any sharp instrument, comparatively little pain is experienced after the skin and membranes are passed through. They are but seldom the seat of disease, except such as proceeds from external injuries. Sometimes, however, dreadful ulcers establish themselves within the muscular tissues, which occasion great swelling, and discharge immense quantities of matter.

Among horse dealers it is a common remark, in discussing the qualities of a particular horse, that "he has muscle." This, of course, refers not to the number of the muscles, but to their size and power. One horse has as many muscles as another. It is only in their quality—in their flexibility and elasticity—that any difference can occur. Here, however, it is very great; and hence one important reason for the extremes which are found in the market value of different animals. A horse's power depends much less upon the amount of his muscle than upon its quality. The superior strength and quickness of some horses are principally owing to their muscular fibers being stronger, more elastic, and possessing greater power of contraction than those of others.

Fattening an animal does not increase his muscles or his strength; nothing but the adipose, or fatty, matter is increased. This gives to the parts a full and rounded appearance, so much admired in the horse, and also covers up many serious defects. The accumulation of fat, when excessive, becomes a positive obstruction to muscular action. A full, rounded form is not an evidence of fine qualities, nor leanness of a lack of them. The horse which is thin in flesh, but in good health and well fed, possesses more muscular power and action, and especially greater endurance, than one very fat. Besides this, the latter is much more liable to disease. While these are facts known to every horseman, it is equally true, however, that a certain amount of adipose matter, with regular and proper exercise, is essential to the possession of the highest degree of vital energy and strength.

The fat of the horse's system has less to do with the mus-

cles than with the skin and hair, whose condition it affects materially. Oozing out at the pores, it oils the entire surface of the skin—which is thus kept soft and pliant—makes the hair smooth and glossy, and thus imparts to the horse one of his chief beauties. This is Nature's own mode of adornment.

There is another agent which has a more important influence upon both the action and the power of the muscles. This is the albumen already referred to. Upon its quality and consistence depends, in great degree, the horse's strength. In it lies imbedded the fibrine of the muscles, which it surrounds on every side, and holds in one compact mass. It is the waxy substance found in green meat, making it stick to the hands, sometimes with considerable force. Its quantity and quality are dependent upon the vital energies, and will be increased or diminished, in both these respects, as the vital forces become impaired, or are improved. On the other hand, its condition has an important reflex influence upon the vital forces.

When the horse is thin in flesh from bad health, or an insufficiency of food, the character of the albumen is materially changed. Not only does it become much less in quantity, but also more sticky and thick. The fibers sink down, one upon another, and adhere to each other to such an extent as greatly to obstruct their action. The difference between their freedom of movement when in a healthy condition, and their retarded action when the animal's vital energies have been seriously impaired, is about the same as one would experience in drawing a thousand separate strings, yet all together, first through oil and next through tar. It requires a labored effort for the feeble or half-starved horse to move the tens of thousands of muscular fibers in his body through the thick, wax-like consistence which characterizes this albuminous matter when he is in such a condition.

The color of the albumen is another important item in this description. The fibrine is white, and the red tint of the flesh is due entirely to the presence of the coloring matter con-

tained in the albumen. When the horse or the beef is in sound health and fine plight generally, the color of the flesh is a light red, bordering on yellow. This appearance is in consequence of the albumen being largely diluted with water, so largely, indeed, that it is now of about the consistency of cream. But let the same animal be much reduced by disease or hunger, and his flesh will become dark red in color, verging on brown, and the albumen thick and sticky, like tar. A very fat horse has ten times as much albumen as a very poor one.

If any one wishes to test the difference which these two conditions present, let him hold in one hand a piece of lean meat from a very fat beef, and in the other a piece from a very poor one. He will readily perceive all that we wish to illustrate. The soldiers often speak of blue beef and sticky beef, declaring that if a piece of their poor, army meat be thrown against the side of a house it will stick there. This shows the effects of extreme poverty upon the albumen of the flesh. Disease produces similar results. The flesh of cattle, it may be interesting to know, does not possess so much of this element as that of horses, but generally much more of the adipose, or fatty matter.

It is the accumulation of albumen that gives the full, rounded muscle, and its thin, mucous consistency is the index of health and good condition. It loosens and lubricates the fibers of the muscles, renders them elastic and flexible, and gives power and tone to their action. It also affords nutrition to the fibrine, and supports its growth. The fact that muscle is composed of these two elements—fibrine and albumen—is an important hint to the farmer in regard to the diet best adapted to keep up or increase the strength of his team. Such articles as contain these substances in greatest proportion, and in such condition as to be most readily assimilated in the formation of muscle, are those with which he should feed his horses. The subject of diet will be discussed in a future chapter.

THE TENDONS.

Of these there are a great many, but the limits of our work will not permit us, any more than in the case of the muscles, even to classify them, nor to make any further mention of them than simply as they come within the scope of our purpose—the history and treatment of the diseases of the horse. All of the muscles end in tendons, and by these are attached, by means of cartilages, to the bones at the joints. To borrow a figure from mechanics, the bones may be considered the pulleys, the tendons the ropes, and the muscles the power pulling at the end of the ropes. Though, in general, non-elastic, the tendons possess great hardness and toughness, and serve an important purpose in the animal economy. Every joint, of course, is provided with them, since it is only by their assistance that motion is obtained at all. They are liable to diseases of various kinds, and are the seat of that dreadful complaint, rheumatism.

It is in two important tendons of the horse's system that fistula and poll evil, those terrible enemies of the equine race, always intrench themselves. The description of one of these tendons will be that of both, since they differ only as regards location. The large one is situated at the top of the shoulder. It is composed of fibers of a remarkable texture and peculiar whiteness, possessing, in addition to the great strength belonging to the tendons in general, a surprising degree of elasticity. It is the *serratus major* of anatomists, (literally, great saw-shaped,) but is popularly known as the white-leather or whit-leather. Extending underneath the top of the shoulder-blade for a considerable distance, it appears to serve the purpose of a pad for the blade to press against, by which means the ribs are protected from injury. It is attached to the chest in front, and to the smooth, internal surface of the blade, and, being strengthened by the muscles, it is of the utmost service in supporting the weight of the body and sustaining the severe shocks of the most daring leap and the most rapid motion. From the upper

extremity of the blade it extends across the top of the back, where it rests upon the point of the vertebræ, and unites with the corresponding tendon upon the opposite side. Thus it hangs across the back like the pads of a saddle.

Fistula, which will be described at length in Chapter VII, is a swelling and ulcération of the *serratus major*, consequent upon some external injury. Poll evil is a similar affection of the smaller of these two singular tendons—or muscles, as they are sometimes called—the *serratus minor*, situated at the top of the head, with which it connects the bones of the neck.

THE MEMBRANES.

These form the thin, smooth coating that extends over all the bones, separating them from the muscles, and that incloses the brain, lines all the cavities of the body, and covers the bowels, kidneys, hearts, lungs, and the other organs of similar location. They also line the mouth, the nostrils, the throat, and trachea, and are found in all places throughout the body where openings occur.

They have received different names, according to their locations and the parts which they invest. The prefix *peri*, signifying over or covering, is used in connection with nearly all the more important of them, and, when thus employed, it designates the membrane which is over, or which incloses, the particular organ or part. Thus the periosteum invests the bones; the pericranium lines the skull; the pericardium is the sack in which the heart is placed; the peritoneum is the strong investing membrane of the external surface of the bowels, and covers the walls of the entire abdominal cavity. A notable exception to the usual nomenclature of the membranes is afforded by the pleura, which envelops the lungs, and lines the cavity of the thorax, or chest. Every farmer and butcher's boy is familiar with the smooth, glossy appearance of the serous membrane throughout the regions of the lungs and bowels, and elsewhere, in the anatomy of the various domestic animals.

The use of the membranes is to protect the organs which they inclose. The serous membrane is very thin, yet hard and tough. It is cut or penetrated with more difficulty than any other part of the body, except the bones. From its smooth surface, hurtful foreign substances readily glide off, if the force with which they strike it be not very considerable. One striking peculiarity of this membrane is its almost entire insensibility. It is too thin itself to contain nerves or blood-vessels of much size. A large number of these, however, lie immediately beneath it. It has no diseases, as yet discovered, but may be torn or ruptured, of course.

THE SKIN.

The skin is the roof and covering of the horse's entire structure. The hair forms an essential appendage of the skin, and is most appropriately considered in connection with it. This is the clothing of the horse's body, renewed by Nature once a year. We extract from Youatt's excellent work upon the English horse the following interesting description of the skin, and its functions:

"The skin of the horse resembles in construction that of other animals. It consists of three layers, materially differing in their structure and office. Externally is the cuticle—the epidermis, or scarf-skin—composed of innumerable thin, transparent scales, and extending over the whole animal. If the scarf-skin is examined by means of a microscope, the existence of scales, like those of a fish, is readily detected. In the action of a blister, they are raised from the skin beneath in the form of pellucid bladders, and, in some diseases, as in mange, they are thrown off in hard, dry, white scales, numerous layers of which are placed one above another. In every part of the body the scarf-skin is permeated by innumerable pores, some of which permit the passage of the hair; through others the perspirable matter finds a passage; others are perforated by tubes, through which various unctuous secretions make their escape; while through a fourth variety numerous fluids and gases are inhaled.

"There is, at all times, a singular change taking place in the outer covering of the animal. There is a constant alteration and renewal of every part of it, but it adheres to the true skin, through the medium of the pores, and also numerous little eminences or projections, which seem to be prolongations of the nerves of the skin. The cuticle is itself insensible, but one of its most important functions is to protect and defend the parts beneath, which are so often exposed to a morbid sensibility.

"Beneath the cuticle is a thin, soft substance, through which the pores and eminences of the true skin pass. It is termed the *rete mucosum*, from its web-like structure, and its soft, mucous consistence. Its office is to cover the minute vessels and nerves in their way from the cutis to the cuticle. It is also connected with the color of the skin. In horses with white hair, the rete mucosum is white; it is brown in those of a brown color; black in the black, and in patches of different colors with those the hue of whose integument varies. Like the cuticle, it is reproduced after abrasion or other injury.

"The *cutis*, or true skin, lies beneath the rete mucosum. It is decidedly of a fibrous texture, elastic, but with difficulty lacerated, exceedingly vascular, and highly sensitive. It is the substance which is converted into leather when removed from the body, and binds together the different parts of the frame. In some places it does this literally, and clings so closely to the substance beneath that it scarcely admits of any motion. This is the case about the forehead and the back, while upon the face, the sides, and flanks, it hangs in loosened folds. In the parts connected with progression it is folded into various duplicatures, that the action of the animal may admit of the least possible obstruction. The cutis is thinnest and most elastic on those parts that are least covered with hair, or where the hair is altogether deficient, as the lips, the muzzle, and the inside of the flanks. Whatever is the color of the rete mucosum, the true skin is of a pale white. In fact the cutis has no connection with the color of the hair. * * *

"Over a great part of the frame lies a muscle peculiar to quadrupeds, and more extensive and powerful in the thin-skinned and thin-haired animals than those with thicker hides. It reaches from the poll over the whole of the carcass, and down to the arm before, and the stifle behind. By its contraction the skin is puckered in every direction, and if it acts strongly and rapidly, the horse is not only enabled to shake off any insect that may annoy him, but sometimes to displace a great part of his harness, and to render it difficult for the most expert rider to keep his seat. This muscle also assists the skin in bracing that part of the frame which it covers, and, perhaps, gives additional strength to the muscles beneath. It is called the *panniculous carnosus*, or fleshy pannicle or covering.

"The skin answers the double purpose of protection and strength. Where it is necessary that the parts should be bound and knit together, it adheres so tightly that we can scarcely raise it. Thus the bones of the knees and the pasterns, and the tendons of the legs, on which so much stress is frequently thrown, are securely tied down and kept in their places. * * * Of its strength we have abundant proof, both in the living and dead animal. Its fibers are interlaced in a most curious and intricate manner, so as, when living, to be scarcely lacerable, and converted into leather after death.

"It is, while the animal is alive, one of the most elastic bodies with which we are acquainted. It not only perfectly adapts itself to the slow growth or decrease of the body, and appears equally to fit, whether the horse is in the plumpest condition or reduced to a skeleton; but when a portion of it is distended to an extraordinary degree, in the most powerful action of the muscles, it, in a moment, again contracts to its usual dimensions.

"It is principally indebted for this elasticity to almost innumerable minute glands, which pour out an oily fluid that softens and supples it. When the horse is in health, and every organ discharges its proper functions, a certain quan-

tity of this unctuous matter is spread over the surface of the skin, and is contained in all the pores that penetrate its substance; and the skin becomes pliable, easily raised from the texture beneath, and presenting that peculiar yielding softness and elasticity which experience has proved to be the best proofs of the condition, or, in other words, the general health of the animal. Then, too, from the oiliness and softness of the skin, the hair lies in its natural and proper direction, and is smooth and glossy. When the system is deranged, and especially the digestive system, and the vessels concerned in the nourishment of the animal feebly act, those of the skin evidently sympathize. This oil is no more thrown out; the skin loses its pliancy; it seems to cling to the animal, and we have that peculiar appearance which we call hide-bound. * * *

"Besides the avenues already mentioned, through which proceeds the unctuous fluid that supples and softens the skin, there are others more numerous, by means of which a vast quantity of aqueous fluid escapes, and perspiration is carried on. As in the human being, this actually exists in a state of health and quietness, although imperceptible; but when the animal is excited by exercise, or labors under some stages of disease, it becomes visible, and appears in the form of drops.

"This process of perspiration is not, however, so far under the control of medicine as in the human being. We are not aware of any drugs that will certainly produce it. Warm clothing seems occasionally to effect it, but this is more in appearance than in reality. The insensible perspiration cannot escape through the mass of clothing, and assumes a visible form. * * * Of the existence of absorbent vessels on the skin, or those which take up some fluid or substance, and convey it into the circulation, we have satisfactory proof. A horse is even more easily salivated than the human being." *

* The correctness of this opinion we do not regard as fully established.

THE HAIR.

In some parts of the horse's body—especially at the neck, where the mane appears, and from the dock, whence depends the tail—grows a peculiarly coarse, strong, stiff hair. This is the horse-hair of upholsters and house-keepers, and is never shed. If it is plucked out or rubbed off, it grows out again, although slowly.

But what chiefly interests us in this connection is the general coat of hair, which Nature has not only bestowed upon the horse as clothing, but has so arranged that it adapts itself to the extremes of heat and cold of the varying seasons. In the spring the old coat of thick, coarse hair comes off, and discovers a new one, about half an inch in length, ready to supply its place. This coat is finer and much thinner than that which has just been shed, and is admirably adapted to the change in temperature. When the horse is in health, it has a smooth, glossy appearance, and is soft and downy to the touch. As the season again changes and the cold increases, a new suit of hair begins to show itself, much thicker and coarser. This is in addition to the finer summer coat, and together they form a dense covering of hair, capable of shielding the animal from great degrees of cold.

We are satisfied that the horse does not shed his spring coat upon the approach of winter, as many have stated. If any one will take the trouble to examine closely, he will find two kinds of hair in the winter coat. There are good reasons for believing that the summer hair takes a second growth as cold weather draws near. In fact the horse always has two kinds of hair. Even in summer there is intermingled with the longer, coarser kind, a shorter hair of almost silken softness. Of the former the horse is relieved in the fall. The latter, which remains until the next spring, takes another growth, and forms the coarse hair of winter, while the fine hair of that season is of a new and much thicker growth. In the spring the whole of the old growth is shed, and with it a portion of the new, since otherwise there would be much

more than the needs of the summer require. The old coat, as the weather continues growing warmer, is gradually replaced by the new. Thus the suit which the horse will need in the fall begins to grow in the spring, and that for the spring in the fall. By these wise provisions Nature keeps the horse constantly in clothing.

The oft-repeated assertion that the horse becomes much weakened and unhealthy during the process of shedding do not seem borne out by the facts. If any animal exhibits any such unfavorable symptoms at this period, the causes may be much more reasonably set down to the change in the seasons and from the stable, with its confinement and dry, unnatural diet to out-door life and grass.

There are oily secretions in the skin, as already described in the extract we have given from Youatt, which in health pour out, and, spreading over the hair, give it the beautiful glossy appearance all so much admire; but when disease is at work, these fountains are often closed, the coat assumes a rough, ragged look, and the hair stands out stiff, dry, and bristling.

THE FEET.

Volumes might be written in regard to the feet, so peculiar is their construction, so important their uses, so severe their services, and so numerous the diseases with which they are afflicted. Many of the latter are among the most obstinate and serious of all the ailments to which horse-flesh is heir. In the veterinarian's descriptions, as in his practice, a large proportion of his time must be devoted to the feet.

Their diseases will be treated of, in detail, in Chapter IV. We can here only stop to give a general outline of their complicated structure, which the reader will be greatly assisted in understanding by referring to the appropriate cuts already introduced.

The hoof is the horny crust or wall that incloses the sensible or living portion of them, and extends from the hair downward to the edge that rests upon the ground. It is

longest in front, where its extreme point is called the toe. Behind it is open, and the crust terminates in a thick, porous skin, divided by a seam at the back part of the foot, and presenting two convex, lateral extensions, which together are called the heel. At the top of the crust, where it unites with the hair, is the coronary ring. This is a thick, spongy substance—soft hoof, in fact, in process of formation. It is to the horse's feet what the roots of the nails are to the human fingers and toes. Another crust, less brittle, and more elastic, extends under the foot, forming the sole, and presenting a somewhat concave surface to the ground. At the back part of the foot is a horny projection in the shape of a letter V, with its opening toward the heel. The two sides of this projection, which should unite at an angle of about forty-five degrees, are called the bars. What horsemen call the inside quarter of the foot, is that part without the bars, next to the opposite foot. The outside quarter lies upon the other side of the foot. Within the bars is the frog. This is of the color of dark India-rubber, which substance it resembles in its degree of toughness and hardness, but possesses less elasticity. The entire crust of the frog is insensible, but at the depth of about half an inch is found the sensible or living portion, exceedingly tender, and filled with innumerable little nerves and blood-vessels.

Inside of the hoof are two spongy bones—the coffin and shuttle-bones (*os pedis* and *os naviculare*)—which are, at times, the seat of most obstinate disease. These occupy little more than one-half the space within the hoof; the remainder is filled by cartilages, tendons, and muscles, through which ramify a greater proportionate distribution of little nerves and blood-vessels than can be found in any other part of the body.

There is a very important tendon (the flexor tendon), extending from the back part of the lower pastern bone (*os coronæ*) and coffin-joint over the extremity of the shuttle-bone, where it divides into two parts, which pass down upon each side of the indentation of the heel and frog, and

unite with the lower extremities of the coffin-bone. This tendon, together with the shuttle-bone, forms the extension of the heel, and lies immediately upon the inner or sensible frog. Hence, any injuries which the latter may sustain will be likely to involve both this tendon and the soft shuttle-bone.

THE BLOOD-VESSELS.

Blood is defined by Dunglison, in his Medical Dictionary, to be "an animal fluid formed chiefly from the chyle, acquiring important properties during respiration, entering every organ through the circulation, distributing the nutritive principle to every texture, and the source of every secretion. The blood is white in many of the inferior animals, and they have been called white-blooded to distinguish them from red-blooded, which class includes animals, birds, reptiles, and fishes. Human blood is composed of water, albumen, fibrine, an animal coloring substance, a little fatty matter, and the different salts, as chloride of potassium, phosphate of lime, subcarbonate of soda, lime, magnesia, oxide of iron, and lactate of soda, united with an animal coloring matter. Arterial blood is of a florid red color; venous blood of a brownish red."

The blood of the horse differs but slightly from that of the human being. The important functions which the vital fluid discharges in the animal economy is sufficiently indicated by the character and variety of its constituent elements, all of which are needed to repair the waste and decay of the system, and which the blood is constantly carrying to every part. In studying the blood of the horse at any particular season, we are studying his general condition; and to keep it pure is the secret of maintaining the animal in health.

Two principal components unite to form the blood. These are the serum, which is the watery fluid, and the coagulum, or clot. It is the latter which contains the little red *corpuscles* which give color to the blood. In quantity, it much

exceeds the serum. Every one can readily find opportunities of marking the difference between these constituents of the blood. It is only necessary to let rest for a few minutes a quantity of the latter, fresh drawn, when a coagulation will take place, by which the clot and serum will be separated.

The circulatory process in animal life suggests the comparison of a pond or lake, first fed by a few considerable streams, which have been formed by other and smaller ones, and these, in turn, by a multitude of little rills, originating in drops of water oozing almost imperceptibly from the earth; then drained by other channels, which divide and subdivide into innumerable rivulets and trickling streams, until, at last, all become absorbed and lost beneath the surface. Yet from the reservoir, hidden in the bowels of the earth, the water finds its way to the surface, where it again oozes out in drops, which accumulate in streamlets and rivers, to feed the lake as before. Again the outlets spread out upon the other side, and ramify, until they are swallowed up beneath the surface. Thus the round continues indefinitely.

In a similar manner the functions of circulation are carried forward. The heart is the reservoir; the veins, the feeding streams; the arteries, the streams that flow away upon the other side.

The circulatory system of the horse, like that in the human body, consists of the arteries, veins, and capillaries. The arteries are the vessels which convey the red, oxygenized blood from the heart to every part of the body. The capillaries are the net-work of minute vessels which ramify through every organ and part, and, though generally spoken of as constituting a distinct system of blood-vessels, should properly be regarded as simply the termination of the arteries and the commencement of the veins—the connecting links between the arterial and venous systems. The veins are the ducts, through which the blood, now become of a dark color, returns to the heart.

Each artery has three distinct coats. The outer one is of a cellular structure, and is capable of great distension; that upon the inside is a serous membrane, presenting internally a smooth surface, which serves to diminish the friction of the blood as it rushes on. The middle coat, largely composed of muscular fibers, is highly elastic. In it resides the power—without which circulation would be all but impossible—of equalizing the flow of blood, retarding its impetuous velocity when near the heart, and accelerating it when considerably removed from that great central force-pump of the system.

Although made up of the same number of coats, the walls of the veins are much thinner and weaker. These vessels are much more numerous than the arteries, notwithstanding which their ramifications may be described, in general terms, as corresponding with the latter. Their internal area is nearly double that of the arteries. They are, of course, much less directly affected by the action of the heart. Hence, their pulsations are scarcely perceptible, and the blood flows through them more slowly. A feature peculiar to the veins is the existence of valves, of various construction, which prevent the blood from returning upon its course, and assist in impelling it toward the heart. These are sometimes single, at others double, and occasionally arranged in threes and fours, around the interior of most, though not all, of the large veins.

Thus far we have considered only the general circulation. When we come to the beautiful process known as the pulmonary circulation, a portion of our description must be exactly reversed—the pulmonary artery conveying the impure, dark blood from the right ventricle of the heart to the lungs, where it is oxygenized, or purified, and thence returns to the left auricle of the heart, through the pulmonary vein, possessed of a scarlet brightness. Interesting phenomena occur in connection with what physiologists term the portal circulation (pertaining to the liver), but they are exceptional and local. We must pass on to a description of the general plan

of the circulation, which has been already anticipated in some measure.

After the purified blood has been returned to the left auricle of the heart, by the means just indicated, it passes into the left ventricle, whose thick, muscular walls contract with immense power, and force it out, through the proper valves, into the aorta, the great artery of the whole body. This divides into two large branches, after proceeding about two inches. The smaller branch is extended, by a multitude of subdivisions, to every part of the head and fore extremities; the larger one, in a similar manner, throughout the body and hind extremities.

The blood is now freighted with the varied elements necessary for repairing the losses by natural decay and wear and tear, which every tissue in the whole body is constantly undergoing. This reparative process is what physiologists call nutrition. It is conducted in the capillaries, the minute and hair-like vessels in which the arteries every-where terminate. Although the capillaries vary greatly in their modes of ramification, according as they minister to gland, membrane, or muscular fiber, their offices are the same in all locations. These offices include, besides nutrition, the gathering up of the worn-out, worthless particles of matter which the organs of excretion are continually throwing off, through the circulation, in all parts of the system. In the performance of these duties, capillary action changes the color of the blood from a scarlet to a brownish red. It also develops animal heat.

The veins now receive this dark blood at their origin amid the net-work of the capillaries, and convey it back to the heart. As they approach that organ, they continue to unite, and grow larger, of course. At length, they pour their entire contents through the two *vena cavæ*, the veins which correspond to the great arterial branches of the aorta, into the right auricle. Only a thin wall of muscle now separates the blood from its starting-point, at the outlet of the left ventricle, upon the other side of the heart. But through this partition there is no passage; nor is the blood ready to pass to the

other side, if there was one. Before it can be sent forth again to minister to the needs of the body, it must be purified. Not only must the particles of effete, cast-off matter, which it has accumulated from every part of the system, be eliminated and thrown off; but the chyle also—the substance into which the nutritive elements of the food have been previously converted by digestion—must be submitted to yet another process before it becomes fully prepared to afford the means of nutrition to the constantly disorganizing tissues of all kinds. (The chyle, it must be understood, empties into one of the *vena cavæ* through the thoracic duct, and mingles with the venous blood which is returned to the right auricle.)

These objects are accomplished through the pulmonary circulation already mentioned. The lungs, composed of two lobes, are of a spongy texture, and filled with innumerable little air-cells. They are furnished with an exceedingly fine net-work of capillary vessels, distributed on their walls, and throughout the surface of all the air-cells also. The impure venous blood, as it circulates through the capillaries, is submitted to the agency of atmospheric air under extremely favorable circumstances. It absorbs the oxygen of the air, and, at the same time, gives off large volumes of carbonic acid gas, this being the form in which the accumulated impurities of the blood now exist. The wonderful rapidity with which this process is carried on may be understood, when it is considered that the extent of surface upon which the minute capillaries ramify in the lungs is supposed to be ten or twelve times that of the skin.

Having been thus purified, the blood regains its bright red, or scarlet, appearance, and is again propelled forward, through the heart and arteries, upon the same excursion as before. It reaches every part of the body, perfectly ramifies throughout every organ, and permeates every muscle, tendon, ligament, bone, and even to the skin itself, and every hair upon its surface. There is no part, however minute, remote, or unimportant, to which it does not find its way, by means of the divisions and innumerable subdivisions of the vessels

which convey it. There is no tissue anywhere in the entire system which does not receive from the blood the elements essential for its development and health—the materials, in fact, of which it is composed. After its work is done here, the blood becomes the scavenger of the body, collecting the impure and deleterious excretions, and returning with them to the heart and thence to the lungs, there to be exhaled in the breath, as already described.

The importance of the arterial flow can hardly be estimated. Without it no function could be discharged, and, in fact, life itself would be extinct. Yet it may be made the sure means of disease, by forcing it into harmful and poisonous substances. Great and constant attention should be exercised in regard to the materials introduced into the stomach, either as food or medicine, since they so surely and speedily find their way into the stomach.

THE HEART.

Of the heart, much has necessarily been said in the preceding section. All that now remains to be added is a description of its different parts, and their offices. It occupies the space between the lungs denominated the *mediastinum*, and is invested by a double membrane of its own, called the *pericardium*. This forms a little sac, whose office it is to support the heart in its natural position, and prevent friction between the heart and the surrounding parts.

Four cavities occupy the spaces within the walls of the heart—two above, called auricles, from their fancied resemblance in form to the ear, and two below, called ventricles. The walls of each ventricle are much thicker than those of the auricle upon the same side, and also in the left ventricle than in the right. Why this difference is quite plain, from the uses of each of these parts, as explained in the last section. The ventricles are in that part of the heart toward its apex, or point.

Into the right auricle open the two vena cavæ and the coronary veins,—those which supply the heart itself with blood.

The right ventricle communicates with the right auricle by an orifice provided with a valve. From it arises the pulmonary artery, through which the *venous* blood is forced to the lungs by the contraction of this ventricle. After being purified in the lungs, the blood is carried back to the left auricle of the heart by the four pulmonary veins, (eight in number when they leave the lungs,) which thus carry *arterial* blood. From the left auricle the blood passes through the mitral valve into the left ventricle, whose powerful walls contract and force it out into the aorta, the great arterial trunk, from which diverge, by successive subdivisions, all the other arteries in the body.

We have seen that there is no communication through the muscular partition separating the right and left sides of the heart. This mode of structure gives much increased power to the contraction of the heart, which is simultaneous upon both sides.

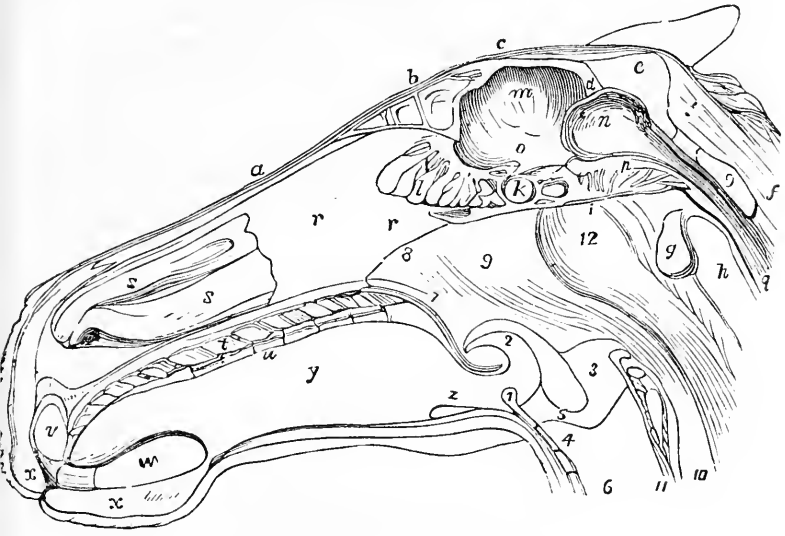
The blood, then, is forced through the arteries by successive impulsions, which are caused by contractions of the heart. When an artery of considerable size comes near the surface, these successive impulsions may be distinctly seen through the skin and coats of the artery, or they may be felt by laying the finger upon them. This is the simple explanation of the pulse in one's wrist. Similar pulses are found in other parts of the body, but none so plain and distinct. We say the pulse is slow when the heart acts sluggishly; or fast when, from disease or excitement, its action is heightened. The beats of the pulse simply indicate so many impulsions of the blood from the heart.

THE PORES.

These have been partially described, in the extract from Youatt introduced in the section treating of the skin. They are the extremities of the capillaries. Physiologists classify them as of two kinds—absorbents and exhalants. The former take up and carry into the circulation portions of the different fluids and gases with which they come in contact on the

surface of the skin. The exhalants throw out fluids to the surface: an oily matter, to lubricate the skin and keep it soft and pliant; and moisture—a not inconsiderable quantity of water—whose purpose, although not clearly demonstrated, is probably to dilute and accelerate the flow of the unctuous secretions.

THE BRAIN AND NERVOUS SYSTEM.



SECTIONAL VIEW OF THE HEAD.

The cut represents a section of the head, and shows not only the location of the different parts of the brain, with the cranial bones, which inclose it, but also gives the anatomy of that entire member, and of the neck. It will be found exceedingly useful for reference, in connection with several other sections of this work.

a The nasal bone, or bone of the nose.
b The frontal bone. The cavities or cells beneath are called the frontal sinuses.
c The crest or ridge of the parietal bones.
d The tentorium, or bony separation between the cerebrum and cerebellum.
e The occipital bone.

f The ligament of the neck—the *whit-leather*, or *pack-wax*—by which the head is chiefly supported.

g The atlas, *sustaining* or *carrying:* the first bone of the neck.

h The dentata (*tooth-like*) or second bone of the neck.

i The cuneiform, or *wedge-shaped* process, or base of the occipital bone. Between it and the other portion of the occipital bone *e*, lies the great foramen, or aperture, through which the prolongation of the brain—the spinal marrow—issues from the skull.

k The sphenoid (*wedge-like*) bone, with its cavities.

l The ethmoid (*sieve-like*) bone, with its cells.

m The cerebrum, or brain, with the appearance of its cortical and medullary substance.

n The cerebellum, or little brain, with its beautiful arborescent appearance.

o A portion of the central medullary (*marrow-like*) substance of the brain, and the prolongation of it under the name of the crus cerebri (*leg of the brain*), and from which many of the nerves take their origin.

p The medulla oblongata—the prolongation of the brain after the medullary substance of the cerebrum and cerebellum have united, and forming the commencement of the spinal marrow. The columnar appearance of this portion of the brain is represented, and the origins of the respiratory nerves.

q The spinal marrow extending through a canal in the center of the bones of the neck, back, and loins, to the extremities of the tail, and from which the nerves of feeling and of motion, that supply every part of the frame, except the head, arise.

r The septum narium, or cartilaginous division between the nostrils.

s The same cut off at the lower part, to show the spongy turbinated (*turban-shaped*) bones filling the cavity of the nostril.

t The palate.

u The molar teeth, or grinders.

v The inferior maxillary bone, containing the incisor teeth, or nippers. The canine tooth, or tush, is concealed by the tongue.

w The posterior maxillary, or lower jaw, with its incisors.

x The lips.

y The tongue.

z A portion of the os hyoides, or bone of the tongue, *like a Greek u, v.*

1 The thyroid (*helmet-shaped*) cartilage of the larynx, inclosing and shielding the neighboring parts.

2 The epiglottis, or *covering of the glottis*, or aperture of the wind-pipe.

3 The arytenoid (*funnel-shaped*) cartilage of the larynx, having between them the aperture leading into the trachea or windpipe.

4 One of the chordæ vocales, *cords* or ligaments concerned in the formation *of the voice.*

5 The sacculus laryngis, sac or *ventriele* of the larynx, or *throat*, to modulate the voice.

6 The trachea, or windpipe, with its different rings.

7 The soft palate at the back of the mouth, so constructed as almost to prevent the possibility of vomiting.

8 The opening from the back part of the mouth into the nostril

9 The cartilage covering the entrance into the eustachian tube, or communication between the mouth and internal part of the ear.
10 The œsophagus, or gullet.
11 The cricoid (*ring-like*) cartilage of the larynx, below and behind the thyroid.
12 Muscle of the neck, covered by the membrane of the back part of the mouth.

All the agents concerned in the existence and movements of animal life would be utterly inert and powerless, had they not been combined with some motive power to excite and regulate their action. Such a motive power the Creator has provided in that wonderful organization the nervous system, consisting of the brain, the spinal cord, and the nerves.

There are many things difficult to be understood in regard to the nervous system and its operations. Some of these are too deep for the wisest and most learned to fathom, much less to satisfactorily explain. But the careful reader can get a good general idea of the structure and offices of its different parts by means of the descriptions which we shall give, aided by the foregoing cut. Perhaps we can do no better than to quote from Youatt:

"The brain of the horse corresponds with the cavity in which it is placed. It is a flattened oval. It is divided into two parts, one much larger than the other—the *cerebrum*, or *brain*, (see *m*, in cut,) and the *cerebellum*, or *little brain*, (see *n*.) In the human being, the cerebrum is above the cerebellum; in the quadruped, it is below; and yet in both they retain the same relative situation. [This arises from the fact that in man the head surmounts the body perpendicularly, while in quadrupeds its position is relatively slanting.]

"He who for the first time examines the brain of the horse will be struck with its comparatively diminutive size. The human being is not, generally speaking, more than one-half or one-third of the size and weight of the horse,* yet the brain of the biped is twice as large and as heavy as that of the quadruped. If it had been the brain of the ox that had been here exposed, instead of that of the horse, it would

* This is a singularly weak statement for so careful a writer. The weight of the horse's body is at least eight times that of a man's.

not have been of half the bulk of that of the horse. If the dog had been the subject, it would have been very considerably larger, comparing the general bulk of each animal. This is singular. The human brain is largest in comparative bulk; then the brain of the dog, the horse, the ox. Thus would they be classed in the order of intelligence.

"When the brain is cut, it is found to be composed of two substances very unlike in appearance, (see *m*, in cut;) one, principally on the outside, gray or ash-colored, and therefore called the *cortical* (*bark like*), from its situation, and *cineritious*, (*ashen*), from its color; and the other, lying deeper in the brain, and from its pulpy nature, called the *medullary* substance. Although placed in opposition with each other, and seemingly mingling, they never run into the same mass, or change by degrees into one another, but are essentially distinct in construction as well as in function.

"The *medullary* portion is connected with the nervous system. The nerves are prolongations of it, and are concerned in the discharge of all the offices of life. They give motion and energy to the limbs, the heart, the lungs, the stomach, and every part connected with life. They are the medium through which sensation is conveyed; and they supply the mind with materials to think and work upon.

"The *cineritious* part has a different appearance, and is differently constituted. Some have supposed, and with much appearance of truth, that it is the residence of the mind, receiving the impressions that are conveyed to the brain by the sensitive nerves, and directing the operation and action of those which give motion to the limbs. In accordance with this, it happens that, where superior intelligence is found, the cineritious portion prevails, and where little beside brute strength and animal appetite exist, the medullary portion is enlarged. There is, comparing bulk with bulk, less of the medullary substance in the horse than in the ox, and in the dog than in the horse. The additional bulk of brain is composed of cineritious matter.

"From the medullary substance, as already stated, proceed

certain cords or prolongations, termed nerves, by which the animal is enabled to receive impressions from surrounding objects, and to connect himself with them, and also to possess many pleasurable or painful sensations. One of them is spread over the membrane of the nose, and gives the sense of smell; another expands on the back of the eye, and the faculty of sight is gained; and a third goes to the internal structure of the ear, and the animal is conscious of sound. Other nerves, proceeding to different parts, give the faculty of motion, while an equally important one bestows the power of feeling.

"One division of nerves, (see *h*, in cut,) springing from a prolongation of the brain, and yet within the skull, wanders to different parts of the frame for important purposes connected with respiration or breathing. The act of breathing is essential to life, and were it to cease, the animal would die. These are nerves of *involuntary* motion; so that, whether he is awake or asleep, conscious of it or not, the lungs heave, and life is supported.

"Lastly, from the spinal cord, (see *q*, in cut,) a further prolongation of the brain, and running through a cavity in the bone of the neck, back, and loins, and extending to the very tip of the tail, other nerves are given off at certain intervals. The spinal cord is combined of six distinct columns or rods, running through its whole length, three on either side. The two upper columns proceed from those tracks of the brain devoted to sensation. Numerous distinct fibers spring abruptly from the column, which collect together, and, passing through a little ganglion or enlargement, (an enlargement of a nervous cord is called a ganglion,) become a nerve of sensation. From the lower or inner side—a prolongation of the track devoted to motion—proceed other fibers, which also collect gradually together, and form a nervous cord, giving the power of motion. Beyond the ganglion the two unite and form a perfect spinal nerve, possessing the power of both sensation and motion; and the fibers of the two columns proceed to their destinations, en-

veloped in the same sheath, and, apparently, one nerve. Each portion, however, continues to be wrapped in its own membrane. They are united, yet distinct; they constitute one nerve, yet neither their substance nor their office is confounded.

"All these nerves are organs of sensation and motion alone; but there are others whose origin seems to be outside of and below the brain. These are the *sympathetic*, so called from their union and sympathy with all the others, and identified with life itself. They proceed from a small ganglion, or enlargement, in the upper part of the neck, or from a collection of little ganglia in the abdomen. They go to the heart, and it beats; and to the stomach, and it digests. They form a net-work around each blood-vessel, and the current flows on; they surround the very minutest vessels, and the frame is nourished and built up; they are destitute of sensation, and they are perfectly beyond the control of the will."

A later English writer* gives the following clear and comprehensive summary of the divisions of the nervous system:

"In the horse, as in all the vertebrata, [those animals supplied with a vertebra, or back-bone,] the nervous system is made up of the following parts: 1. The ganglia, which are intended to subserve what are called the reflex actions of the organs of locomotion, etc., and which occupy the whole length of the spinal cord, one on each side. 2. The respiratory ganglia, situated higher up, toward the brain, constituting the part called *medulla oblongata*, (see *p*, in cut,) and placed in superintendence over the functions of respiration, mastication, and deglutition. 3. A series of ganglia, controlling the organs of special sense, [the sense of sight, of hearing, of taste, etc.,] situated at the base of the brain. 4. The *cerebellum*, which seems especially intended to combine and balance the several muscular actions of the body. 5. The *cerebrum*, which is the seat of intelligence and will. 6. The sympathetic sys-

* J. H. Walsh (Stonehenge).

tem of ganglia, which specially controls the vital organs of circulation, digestion, and excretion. The first five divisions are generally included under the head of the nervous system of *animal* life, the last being considered to be peculiar to *organic* life."

Before passing to the next section, we must not forget to mention the membranes of the brain. These are three in number, each completely investing it. The outer or upper one is called the *dura mater*, and is fibrous in texture, and quite strong. The middle one, called *arachnoid*, is a serous member of the ordinary character. The inner one, denominated the *pia mater*, is full of vessels, and is by far the most tender. Being next the brain, however, it is less exposed to injury than the others. The *pia mater* penetrates into every depression, lines every ventricle, and clothes every portion of the brain.

RESPIRATORY ORGANS.

The important function of respiration is carried on through the lungs and the nasal cavities, and the tubes by which these are brought into communication, with the assistance of the inspiratory muscles and the system of respiratory nerves.

The lungs are invested by the *pleura*, a serous membrane, which is reflected or doubled back upon the walls of the thorax, or chest. They consist of two conical, spongy bodies, called the right and left lobes of the lungs. They are divided from each other by a doubling of the pleura and a space, called the *mediastinum*, which is occupied by the heart, great blood-vessels, nerves, and glands. The right lobe is noticeably the larger, by which arrangement the lungs are better adapted to the form of the chest, and enabled more perfectly to fill it. In consequence of their extremely cellular or porous structure, they are capable of great expansion and contraction during the operation of breathing.

The substance of which the lungs are mainly composed is the pulmonary tissue, termed the *parenchyma*. This, in the healthful subject, has a beautiful pale-rose color. It is very

delicate, yet resists external violence with sufficient strength as not to be easily broken. When minutely examined, it is found to be composed of a countless number of very small, irregularly-shaped compartments, called lobules, each entirely distinct, and all without any communication one with another. What is known as broken wind is occasioned by the rupture of the walls of some of these little compartments. Each lobule receives one of the terminating branches of a bronchial tube, and is again broken up into a cluster of air-cells, on the walls of which the capillary branches of the pulmonary arteries and veins are spread out. The innumerable air-cells are lined with a thin, attenuated membrane, through which the blood, in passing through the lungs, appropriates the oxygen, the life-giving principle of the air, and gives off the poisonous carbonic acid gas which the venous circulation has brought back from all parts of the system. Carbonic acid gas is highly destructive to animal life, and is that element which chiefly makes the exhaled breath so peculiarly offensive.

The nasal cavities subserve the purposes of respiration, by modifying the condition of the impure air, so as that it may be taken into the delicate air-cells of the lungs without injury. They warm the air, if it is too cold; they moisten it, if it is too dry. In the horse, the nostrils are remarkable as furnishing the sole means of admitting air to the lungs, such being the formation of his soft palate that breathing through the mouth is impossible; yet he is enabled, by considerable effort, to expel the air through the mouth in the operation of coughing. The nostrils are lined with what anatomists designate the Schneiderian membrane, whose appearance, and especially its color, is an invaluable test for detecting the presence, and tracing the course, of fever in the system.

From the nostrils the air passes first into the larynx, or throat; thence into the trachea, or windpipe; and, finally, through the bronchial tubes into the lungs.

Besides its services in respiration, the larynx (see 4 and 5 in last cut) forms the vocal sounds uttered by different ani-

mals, as well as those produced by the human voice. In the horse, however, these vocal sounds are few, so that this function is not an important one. The larynx is situated immediately behind and below the nasal cavities. It consists of five strong cartilages, united together by ligaments. One of these cartilages is that remarkable little valve-like appendage called the *epiglottis* (see 2 in cut). This somewhat resembles a heart in shape, and is so attached that, when the animal swallows, it shuts downward and backward, so as to entirely close the opening to the larynx. Thus the food and water, in their passage to the stomach, are prevented from entering the lungs, but go onward into the œsophagus, or gullet (see 10 in cut), after which the elastic muscles of the epiglottis in an instant throw it back to its original position, and the windpipe is open again.

Next below the larynx comes the trachea, or windpipe, (see 6 in cut,) which is a flexible tube, made up of about fifty incomplete, cartilaginous rings, connected together by a strong, elastic membrane. It terminates in the bronchi, or two bronchial tubes, of which the right is the more capacious, corresponding with the difference in size of this lobe of the lungs. These tubes again divide and subdivide, like the branches of a tree, into lesser tubes, still called bronchial, which finally open into the air-cells of the lungs. As they thus continue to divide, they diminish in size, of course, until at last their diameter is only the one twenty-fifth part of an inch.

The philosophy of respiration we have already explained, in connection with the circulation. The lungs operate on the same principle as a pair of bellows. By the action of the inspiratory muscles—situated in the thorax and abdomen—the cavity of the chest is expanded, when the air rushes in to fill the vacuum. The muscles then contract, and the air, laden with its foul gases, is forcibly expelled. They are under the control of the will only to a limited degree.

THE SALIVARY GLANDS—SECRETION AND EXCRETION DEFINED.

"A gland may be defined to be an organ whose office it is to separate from the blood some peculiar substance, which is poured out through an excretory duct, whose internal surface is continuous with the mucous membrane or skin.

"By secretion is understood the process of separation of various matters from the blood, the term being also applied to the products of the process, such as saliva, bile, etc., which are commonly known as secretions. These are all removed from the blood for one of two purposes; first, in order to be employed for some ulterior object in the various processes going on in the body, either for its own preservation or that of others; or, secondly, as being injurious to its welfare, and, therefore, to be discarded."

It has been customary to distinguish this function according as it has for its object one or the other of the purposes above indicated. By this distinction, the term *secretion* is limited to the former action, while the latter receives the name of excretion. These are the senses in which the terms are used in this work.

The throat is a part of the horse's frame that is plentifully supplied with glands. It has three sets of these, throwing out their secretions of saliva to form the spittle of the mouth. In the horse, although there is somewhat less of this discharge than in the human being, its quantity is surprisingly great, not less than four or five gallons in every twenty-four hours. The principal use of the saliva is to moisten the food during the process of mastication.

The most important of the salivary glands is the parotid. This is placed in the hollow that extends from the root of the ear to the angle of the lower jaw-bone. It is composed of numerous small glands, uniting in one common duct, that discharges its contents into the mouth opposite the second jaw tooth. The quantity of fluid secreted by the parotid gland alone is estimated to be not less than one pint per hour, and, during mastication, nearly twice as much. It is

generally affected in all throat diseases, and in colds is nearly always found swollen, hot, and tender.

Occupying the space between the two bones of the under-jaw, is found the set of submaxillary glands, which also empty through one common channel into the mouth, at the roots of the tongue, and a short distance from the front teeth. In severe colds, the submaxillary gland often enlarges, the little kernels of which it is made up swelling so as to be distinctly felt when pressed upon by the hand.

The sublingual gland is the smallest of the three. It is situated between the middle of the tongue and the lower jaw, and opens into the same part of the mouth as the submaxillary, by a number of minute orifices under the tongue, whose terminations resemble little folds of skin, or tiny bladders. These sometimes become inflamed, and then have the appearance of little sores, or ulcers. This is soon corrected by the efforts of Nature alone, in nearly all cases; but, if it should be thought best to attempt any treatment, the horse's mouth may be washed with the solution of golden seal, or chlorate of potash.

Besides these glands, there are smaller ones in every part of the mouth, the cheeks, the tongue, the lips, and several other portions of the throat. They all pour out secretions, which enter into the composition of the saliva.

THE STOMACH AND INTESTINAL ORGANS.

Although not really included within this division of the horse's anatomy, the œsophagus, or gullet, will be most appropriately considered in connection with the digestive apparatus. It is a funnel-shaped tube, or bag, of muscular structure, and is lined with mucous membrane—the same in general character as that which is spread over the inside of the mouth and nose. It extends from the pharynx—which is simply a continuation of the extreme back part of the mouth—to the stomach, in its course traversing the whole length of the chest, and passing through an opening in the diaphragm, or midriff. It is, at first, placed behind the

larynx, and, with reference to the trachea, is situated to the left.

The digestive organs of the horse are so important, as regards both their aggregate size and their functions, and are so extremely liable to sudden and severe attacks of disease, that every farmer and horseman should be at especial pains to get a correct notion of their structure, and the offices which they severally perform. The reader of this section will derive material assistance in fixing its descriptions in his mind by turning to Chapter XIII, and carefully studying, in connection with our descriptions, the representations of the stomach and the bowels, which are there introduced. To aid him in this we shall frequently refer him to those cuts.

The stomach of the horse is very small, when compared with the great bulk of his entire body, or with the relative size of the same organ in man. Its average capacity is about three gallons; while the stomach of man, whose weight is hardly one-eighth of that of the horse, contains frequently three quarts. As the vegetable diet, however, upon which the horse subsists, yields a smaller proportion of nutritive matter than animal food, and that proportion with greater difficulty, it is necessary that the animal should be provided with a digestive apparatus of greater extent and perfect efficiency. What seems to be wanting in the stomach of the horse, we accordingly find made up in the formation of the intestines, which are long, large, and complicated. We will consider them presently.

Two openings and two sacs form the features which one would be most likely to notice first, in examining the stomach. The upper opening is the connection with the œsophagus. It is called the *cardiac orifice*, and in the cut of the stomach is shown at *b*. Youatt describes this entrance of the œsophagus into the stomach as follows: "The œsophagus enters in a somewhat curved direction. It runs obliquely through the muscular and cuticular coats for some distance, and then its fibers arrange themselves around the opening into the stomach. Close observation has shown that they

arrange themselves into segments of circles, interlacing each other, and, by their contraction, plainly and forcibly closing the opening, so that regurgitation of the food (vomiting) is almost impossible."

The other opening is that which communicates with the intestines. It is called the *pylorus*, (literally, door-keepers,) or *pyloric orifice*. In the cut it is imperfectly represented at *f*. We quote again from Youatt: "At the lower, or pyloric orifice, the muscles are also increased in number and in size. These are arranged in the same manner (as around the cardiac orifice), with sufficient power to resist the pressure of the diaphragm, and retain the contents of the stomach until they have undergone the digestive process."

Similar names have been given the two sacs—the cardiac and pyloric. The division of the stomach into these two parts is not uniformly marked in different horses, but is generally indicated, more or less plainly, by a constriction. It is shown in the cut by *d d*, the jagged and heavily shaded line between *c c* and *e e*. The cardiac sac is simply a reservoir of the food, while the pyloric is the real digestive stomach.

The stomach is composed of three coatings. The outer coat is a serous membrane, and simply a continuation of the peritoneum, which lines the entire abdominal cavity. Next to this is the muscular, or middle coating, consisting of two sets of fibers crossing each other transversely, which give to it a considerable power of contraction and expansion. By this means a gentle vibratory motion is imparted to the stomach, and all its contents are properly mingled together and carried forward. The internal coating is not the same in the two sacs of the stomach. In the cardiac sac it is commonly called the *cuticular* (skin-like), or *insensible* coating (see *c c* in cut); in the pyloric, the mucous or *villous* (velvet) coating (see *e e* in cut).

The cuticular lining is a continuation of that of the œsophagus. It is whitish brown in color, tough, and comparatively dry. It covers only about one-third of the internal

area of the stomach—in the upper part, of course, next the gullet. In structure it is web-like, with a somewhat loose attachment to the muscular membrane, from which it may be easily separated after death. When washed and cleaned, it has the appearance of gauze, or fine net-work. The villous coating of the stomach is of a brownish red, marbled with lighter tints of the same color, and possesses a delicate texture, so as to be easily torn; yet it has an exceedingly limited degree of sensibility, since, were it otherwise, many common articles of the horse's food could not be digested without great pain. Numerous little capillary tubes have their outlet upon this membrane, and pour out a peculiar secretion, which continues the softening process already begun in the mouth by the saliva. This is the *gastric fluid.* It acts not only as a solvent, but also contributes other materials—especially what is called *pepsine*—that greatly facilitate digestion.

By these agencies the food is converted into the substance called *chyme*, which passes out through the pylorus into the intestines, there to be still further digested, its nutritive particles taken up and transferred to the general circulation, and its waste matter duly avoided.

The intestines, to which we have now come, in the natural progress of our descriptions, constitute a hollow tube, with many windings and convolutions, nearly ninety feet long in an average-sized horse. In diameter the tube varies exceedingly at different parts. The intestines have three coatings—the same, indeed, as the stomach, with only this difference, that they nowhere exhibit the cuticular lining. These membranes, however, are not precisely identical in their several arrangements and uses throughout their entire length.

The muscular coating of the intestines is composed of two sets of fibers, crossing each other at right angles, and each running transversely with the line of the bowels. In certain intestinal diseases of the horse, it is subject to fearful contractions, producing what are called strictures. In the mucous or internal membrane are seated myriads of little capillary

vessels, which have their mouths upon its surface, and are constantly taking up the nutritive extracts of the digested food and conveying them into the blood. The point of the finest needle could not be put down anywhere upon the mucous surface on which these vessels are distributed without resting upon one or more of these little mouths. From the effects of severe ill-usage, as well as of certain diseases, these absorbents sometimes cease to act. Should they remain inactive, the horse, with his supply of nutrition thus cut off, is soon reduced to a famishing condition.

Only two natural divisions are found in the alimentary canal. These are the large and small intestines. Anatomists, however, have divided each of these parts into three sections. This subdivision is particularly arbitrary in regard to the small intestines, between whose three sections it is impossible to discover any defined boundary lines. Hence in the cut of these organs, which appears in Chapter XIII, we have not attempted to index the different portions of the small bowels. Their continuous series of convolutions, however, are represented very naturally and plainly at *b b*.

The small intestines occupy rather more than two-thirds of the whole length of the alimentary duct, being between sixty and seventy feet in length. From their comparatively small diameter, however, they will contain only a little more than one-half as much as the large bowels. When fully expanded, they will hold about eleven gallons; the others about nineteen. Adding to these amounts the three gallons which represent the measure of the stomach, and we find that the entire capacity of the digestive tube is the enormous aggregate of thirty-three gallons.

The three sections into which anatomists divide the small intestines have received the names of the duodenum, jejunum, and ileum.

Duodenum is a Latin word, signifying twelve. It is thus applied because this part of the bowels in man is about twelve inches long. In the horse, however, its length is about twenty-two inches. It extends from the pyloric orifice

of the stomach to the entrance of the biliary and pancreatic ducts. (See *a*, in cut of intestines.)

The *jejunum*—from the word jejune, meaning empty—is so called because it is nearly always found quite empty after the animal's death. This is in consequence of the great rapidity with which the food passes through it. It is of smaller diameter than the duodenum, and floats more loosely in the abdomen.

Last of the small intestines comes the *ileum*, whose walls are more muscular and thicker than those of the jejunum.

The ileum terminates in the *cœcum*, or blind gut, the first of the large intestines. Its entrance is not into the end of this, as would naturally be expected, but near the head, or outlet, as shown in the cut, where the cœcum appears prominently at *c*. It follows, from this arrangement, that the food which passes into this blind pouch must twice traverse its whole length, on its return from the closed end of the pouch passing directly by the mouth of the ileum, where it is prevented from re-entering by a peculiar valve. In the cœcum, as is supposed, the larger proportion of the process of absorbing the nutritive elements of chyle is conducted. Nearly all the water which the horse swallows passes at once into this gut, without any delay in the stomach and small intestines.

The cœcum is connected with the next intestine, the *colon*, (see *f g g*, in cut,) by a considerably larger neck than with the small intestine. The colon is very large, and occupies two-fifths of the abdominal cavity. It is generally found filled with the alimentary substances. Its contents are made up of the coarser parts of the food, and become hard and solid. Being deprived of nearly all its moisture and nutrition, the food reaches the tapering portion of the colon, which is divided into sections, or compartments, by a number of circular bands surrounding and puckering it. By these, the fœces is separated into balls, upon which they contract, their absorbents extracting the last remaining nutrition, when, by a further contraction, each ball is forced onward to the rectum, from whence it is discharged.

Terminating in the *anus*, (see *i*, in cut,) is the next and last intestine, the *rectum* (see *h*, in cut). Its name signifies straight, which it much more nearly is than the other bowels. It is much shorter than the colon, with less than one-fourth the capacity. As no portion of digestion remains to be carried on here, its mucous lining is not exactly the same as in the other parts of the intestines, and is entirely destitute of capillary absorbents. The rectum forms a capacious reservoir for the excrement until evacuated. This is retained in its place by the curious circular muscle at the anus, called the *sphincter* muscle, until the horse, by a voluntary effort, expels it. By these means, Nature prevents a constant and disagreeable dropping of the fœces.

A doubling of the peritoneum, called the *mesentery*, (see *c*, in cut,) forms the means by which the intestines are chiefly retained in their relative positions. It includes within its folds all the intestines, exteuding along their entire length. It is furnished with a large artery and a large vein—each called the mesenteric—and is every-where filled with innumerable small vessels, that supply the bowels with blood, and others which convey the extracted nutriment from the intestines to the general circulation.

The *omentum*, or cawl, (not shown in cut,) is a twice doubled fold of the peritoneum, thus consisting of four layers of it, which are placed between the intestines and the sides of the belly. By some it has been supposed to answer the purpose of a soft padding, to relieve the violent concussions and prevent the injuries which rapid motion would be likely to produce. It is unusually short in the horse.

THE LIVER.

In the horse the liver undoubtedly performs the same offices as in the human being; but these are involved in much obscurity. It secretes the bile from the venous blood, (supplied to it by the portal circulation,) which, if retained therein, would poison the whole system; but which, when mingled with the chyme, is of the highest service in the

operations of digestion. It is by far the largest gland in the whole body.

The liver is situated in close contact with the right side of the diaphragm, and is divided into three lobes, with a color peculiar to itself. Its structure is also most peculiar. The bile is said to be secreted in small granules in this organ, called *acine*, from their resemblance to the stone of certain small berries. But when the liver is cut open, we find every part of it filled with little tubes, from which exudes a thin, yellow fluid. This is evidently the bile, but, as yet, without the bitter qualities, which it probably acquires afterward from the *acine*. In most animals the bile is stored away in a reservoir, called the gall-bladder, to be used as occasion may require; but the horse has no gall-bladder, so that the bile, as fast as it is formed, flows directly into the small intestines. These it enters through the hepatic or biliary duct, a few inches below the pyloric orifice. (See *a*, in cut of intestines.) It is of the greatest importance in the work of digestion. The whole system suffers, if its secretion and flow are interrupted or retarded. Should they cease altogether, not only would the blood be poisoned by its retention, but the animal would presently starve for want of nourishment.

This organ is much less subject to disease in the horse than in the other domestic animals, or in man. It is occasionally the seat of inflammation and some other affections, whose symptoms, however, are always obscure. Sometimes, where its functions are deranged, a condition is produced much resembling that of jaundice in the human being. This may be detected, without difficulty, by the yellow, pale color of the membrane lining the nose, and of the lips, the mouth, the tongue, and especially by the jaundiced appearance of the eyes.

THE PANCREAS.

This is a gland placed between the stomach and the left kidney, being what is commonly called the sweet-bread. It

secretes the pancreatic fluid, which flows through its own duct into the small intestines through a valvular opening common to the hepatic and pancreatic ducts. (See *g*, in cut of the stomach.) In its uses, the pancreatic fluid is apparently similar to the saliva. It contains a large proportion of albumen and some free acid.

THE SPLEEN.

This organ, often called the melt, has no excretory duct, and, hence, can hardly be called a gland. It lies along the left side of the stomach, to which it adheres very closely. It is long; at one end broad and thick, and at the other tapering almost to a point. In color, it is of a bluish brown. It has a spongy consistency, being composed of numerous cells, over which are spread thousands of minute vessels. Physiologists have not been able to positively demonstrate the uses of this organ. It is believed, however, "to perform the office of a reservoir for the blood required by the stomach, with which it is closely connected by a set of vessels, and also to effect some change in the blood itself."

THE URINARY ORGANS.

These embrace the kidneys and the bladder, with the different ducts and passages that are connected with them.

The kidneys secrete the urine. They are two glandular organs, whose function it is to rid the system of the element called urea, which is that principal constituent of the urine that, if not excreted, would act as a deadly poison in the blood. In the horse they are of immense size, and are situated under the loins, the right kidney lying under the liver, and somewhat forward of the left, which is placed back of the stomach. Each of them is supplied with a large artery, which furnishes blood not only to the kidneys themselves, but likewise to all the urinary organs. Like all other glands, the kidneys abound in minute capillary vessels, where the functions of excretion are carried on. The amount as well as the quality of the urine which they secrete varies greatly,

at different times, in all animals, but in the horse more, perhaps, than in any other. As fast as it is collected in the kidneys, the urine passes down to the bladder through the long excretory ducts, called the *ureters*, of which there is one for each kidney.

The bladder is the oval membranous bag, which serves as a reservoir for the urine. Here it accumulates until its quantity begins to occasion inconvenience, when the animal, by a voluntary effort, expels it. Thus the great annoyance of a constant dribbling is prevented. The bladder has three coatings. The outer one is an extension of the peritoneum, but covering only a part of the bladder. Next to this, and upon the outside of the bladder for a great part of the latter's surface, is the muscular coating, composed of two sets of muscles, crossing each other transversely, as in the intestines. The internal coating is the mucous membrane, which lines all the hollow viscera. The *urethra* has its origin at the neck of the bladder. It is the canal which carries off the urine. Its orifice can be entirely closed, at the horse's pleasure, by the contraction of the powerful muscle which surrounds the neck of the bladder.

The urinary organs have a number of diseases. These will be fully described in the proper place.

This completes all that our limits will permit us to present of the anatomy of the horse—all, indeed, that the purpose of our work requires. The reader who wishes to pursue this subject further, is referred to those highly scientific and valuable works, Percival's "Anatomy of the Horse," and "The Horse in the Stable and the Field," by J. H. Walsh, (Stonehenge.)

CHAPTER III.

DISEASES OF THE BONES.

BIG HEAD AND BIG JAW—EXOSTOSIS OF THE BONES.

BIG HEAD.

This disease has a very peculiar history. It is exclusively American. In Europe it appears to be entirely unknown. The English and French writers upon the horse have made no mention of it whatever, a circumstance which could hardly have occurred had the disease been known to them, or even to the ancients; and of American authorities, though all must have been well aware of its existence, but few have given it any attention, probably from a want of knowledge of either its history or treatment, or, perhaps, of both.

It prevails most extensively in the great Valley of the Mississippi—in the States of Tennessee, Arkansas, Mississippi, Louisiana, and Alabama. As we recede from the great river and its influences, it gradually diminishes; yet isolated cases may be found throughout the country from the Eastern sea-board to the plains of the far West, and from the vicinity of the Ohio and the Potomac to the Gulf of Mexico. Its ravages appear to have been most of all destructive in Western Tennessee, Northern Mississippi, and

Eastern Arkansas, where, at one time, it assumed the features of an epidemic. During the years from 1849 to 1858 the author traveled extensively through those sections, and also through Northern Alabama, for the purpose of gaining a more perfect knowledge of this disease, and, if possible, to discover its cause and cure. It was not uncommon to find, upon the smaller estates, from one to five horses and mules afflicted with big head in its worst forms, while the larger cotton plantations frequently presented the sad spectacle of twelve or fifteen utterly hopeless cases.

At that period the most lamentable ignorance reigned every-where in regard to this disease—its nature, causes, and treatment. Its pathology was not understood by any one. A few modern horse doctors had published their views upon it in pamphlets, and two, perhaps, in book form. Carver and Mason had noticed it only to pronounce it incurable; yet each gave what he called a remedy, which, however, was found to be conceived in ignorance and born in cruelty. In no solitary instance was there any rational connection between the nature of the disease and the treatment applied to it.

These works threw no light upon the subject, and furnished no clue to its intelligent study; they only "darkened counsel," and made investigation more difficult and uncertain. To discover the true nature and proper treatment of big head was, indeed, a herculean task. There were no books and no teachers, only the dreadful scourge and its operations; for the school, only the stable lots of the planters; no encouragement pecuniarily, and little in any other way. The pathology of the disease was to be written, its diagnosis formed, and its *materia medica* collected and applied under the most unfavorable circumstances. Every-where the horse doctor was looked upon with the utmost odium, and his name regarded as only a synonym for imposition and low-bred ignorance. It would be impossible, at this period of time, to convey to the mind of the reader any adequate idea of the utter contempt and detestation in which the horse doctor's profession was then commonly held. Every thing had to be

done, too, at the expense and trouble of the poor practitioner himself, on the terms of "no cure, no pay;" and very often, indeed, it *was* no cure and no pay. Such were some of the difficulties which, at the outset, met the author of this work. At the very threshold of research, this terrible malady, big head, presented its most formidable front, and the curt language of the people of the country was commonly such as this: "Take that old horse with the big head, and try your hand on him. If you can cure him, you can cure any of them." But the work was entered upon with the determination to succeed in clearing up the mysteries enshrouding the subject, and, if possible, to discover some rational means of cure. That this was accomplished may now be seen, and thousands at the South will attest.

Old horses are much more likely to be attacked by the disease than the young and vigorous, though no age or condition is wholly exempt. The sucking colt, the yearling, the two-year old—in fact, all ages of both horses and mules—may show the enlargement or protrusion of the frontal bone, which is the unmistakable feature of big head. Within the author's observation, though the bones of the head and upper jaw were frequently enlarged, there were no cases of *bona fide* big jaw among colts. The disease does not appear to affect the colt to the same extent as the old horse; the general system is but little involved, and nature sometimes effects a cure without other assistance. The mule, though less subject to it than the horse, often has the big head, but is always much more easily treated. The author recollects no case of the mule colt having it.

It is a remarkable fact that the region of country best adapted to the culture of cotton is also that most favorable to the development of big head. The disease is the most destructive in malarious districts, and, indeed, may be said to be almost entirely confined to them. The cotton plant attains its most perfect growth in precisely the same localities.

In limestone regions it is much less frequent, even where all other predisposing agencies are the same.

THE CAUSES OF BIG HEAD.

The fact just stated points strongly to the conclusion that among the many causes which combine to produce big head, is the water found in the sections where it prevails, which is generally strongly impregnated with sulphur, iron, and other minerals. It is soft, such as is found in freestone formations, and entirely destitute of lime, a substance entering largely into the composition of the bones. The bones are composed mainly of phosphate of lime, a combination of lime and phosphorus. For the former, the horse is chiefly dependent upon the water which he drinks, his food supplying the latter. Fresh water does not furnish phosphorus, nor vegetation lime, except in very limited quantities. The lime contained in some water is not free, but exists in combination with other substances, and in such cases there will be an excess of phosphorus in the secretions above what is needed to supply materials for the growth and repair of the bones.

Water performs the office of a solvent in the digestive functions of the stomach. It softens the food into chyme, which, passing into the small intestines, there receives the gastric secretions of the hepatic and biliary ducts, and by their aid is still further digested. The nutritive particles are next extracted, and, in the form of chyle, are conveyed to the blood. Lime is mechanically combined with water, and, when it is free, unites readily in this process with the chyle, and with it is carried by the blood to the bones. Phosphorus is secreted from the food, and supplied to the bones in the same manner.

The water in Western Tennessee, Northern Mississippi, and Eastern Arkansas is not only singularly devoid of lime, but is remarkable for containing so many other minerals. This condition of the water, however, can not be regarded as the sole cause of big head. In some parts of our country, where there is still less lime in the water, the disease is well-nigh unknown, and, even in the sections named, many horses escape. But that it is, at least, a predisposing agency can not reasonably be doubted.

Another important consideration, in tracing out the causes which unite to produce big head, is the food which the horse eats. In grass-growing countries the disease is rare, and even in the infected districts horses seldom have it, if they have access to good pastures. It is the same privilege which so largely protects the young colt, in most instances. The soil in those sections of the South which appear to be its principal theater of operations is very dry and sandy, bearing only a species of wire-grass in the early spring. Even this lasts but a few months, becoming so hard by July or August that stock refuse to eat it. At the South, unless there has been a great improvement in this department of plantation management within a very few years past, the horse is seldom allowed the benefit of even this poor grazing, but, when not in service, is usually kept in the stable, or a dry stable-lot.

If a proper system of plantation management—of grooming and feeding—were adopted, the evil would be overcome to a great extent. But corn, and corn-blades stripped from the stalk in the month of August and dried, constitute the principal food in the stables of the South. It is,—or at least was, during the author's residence in that region,—a common practice to feed nothing but these for months together, the horse, meanwhile, being kept at continuous hard labor. Corn is very heating in its tendency, and, as an exclusive diet, always occasions more or less fever. It is to the horse what meat is to his driver; a portion may be eaten beneficially, but if the diet fails to combine other articles, derangement of the system and consequent illness must follow. A horse which lives exclusively upon corn feed is seldom entirely free from fever.

No common aliment is probably less favorable to the animal health than corn fodder, at least as it is harvested at the South. It is very dry, always dusty, and, while possessing little substance, has a strong tendency to thicken and dry up the blood. The corn is often very much injured by rains, while standing in the field; in many cases the crop is not

gathered until midwinter, and sometimes not even until spring It is no uncommon scene, in Tennessee and Mississippi, to find one set of hands gathering the corn in one-half of the field, while in the other a second set are putting in the new crop. Corn that stands out a whole winter in this way must, of course, be greatly injured, becoming water-soaked, and some of it actually rotten. Not only that which falls down upon the wet ground is damaged; but, of what remains standing, the large or stump-end of the ears are generally much softened, if not decayed. The same is true of the fodder; most of it, by standing out in shocks, becomes damp and moldy.

On such food two-thirds of the horses at the South are compelled to live, and, as a consequence, more than one-half of them suffer continually from fever. No wonder they have big head, and every other disease that horse-flesh is heir to; the only marvel is that they are ever well, or, indeed, that they live at all. To feed them corn exclusively is bad enough, but when that corn is rotten, and is eked out by moldy fodder, the condition of the poor animals is deplorable.

In connection with water and food, climate has, undoubtedly, a powerful influence in developing big head. The fact that the scourge is almost entirely confined to malarious districts has been already stated. Cases may occur elsewhere, but they are of rare occurrence, while, on the other hand, the stronger the malarious influence the more frequent is the disease. In Western Tennessee and Eastern Arkansas, portions of country well known for their unhealthfulness, it is most common and fatal, increasing as we approach the Mississippi. The whole valley of that great river, from the mouth of the Ohio to the Gulf, is low, damp, and malarious.

Nor must bad treatment be overlooked in enumerating the causes of big head. No one who has given the subject any attention can have failed to notice that the horse well cared for and kindly treated is much less likely to contract the disease than one ill-used. On many Southern plantations there are no stables; and on many others it was not uncom-

mon, a few years ago, to find the horse in the pens which were called such, half-leg deep in mud and water, at midwinter, and in summer standing upon great steaming piles of manure. He was generally left in the sole charge of careless negroes, who neither knew, nor cared to know, much about his wants or his health; and who, after working the faithful creature hard all day, and abusing him recklessly, thought their duty fully discharged, if at night they shut him up in these pens, to gorge himself from a trough-full of corn and fodder. And the practice was the same, without any reference to his condition or his health, whether he was sick or well, or whether overheated by violent exercise or not. Nor did the poor animal's ill-usage always end even with this. Often he was pressed into the service of some pilfering or trading expedition, conducted under cover of night; ridden at the top of his speed to the rendezvous; tied to a tree in the woods, without any protection from the weather, no matter how cold; and then, in the morning, galloped back, until he was steaming with perspiration, just in time to eat his corn and be driven out to work again. Such was the treatment of thousands of horses at the South fifteen or twenty years ago. Of course, disease did a fearful work among them.

Succinctly presented, then, the agencies principally concerned in producing big head are bad water, improper feeding, malarious influences, and general ill-usage. Not all of these, it must be understood, are necessarily in active operation at the same time. Horses have had the disease that were as well cared for as possible, and cases have occurred in sections where the water was good and abounded with lime. But neither horses nor mules, it is believed, ever suffered from big head whose food was not largely made up of corn, and but few in localities entirely free from malaria.

NATURE AND LOCATION OF THE DISEASE.

Big head is a disease of the bones, beginning with an enlargement of the bones of the head and jaw, and ending with

general necrosis—that is, "death of the bones." During its progress, the bones of the entire system, from a lack of material in the blood, gradually waste away, so that, after the death of its victims, they are frequently found to be no more than one-half, or even one-fourth, their usual thickness while in a healthy condition. They become mere shells, entirely destitute of marrow, and so brittle as to be easily broken by the pressure of the foot, or by a blow from the blade of a large pocket-knife. Before a fatal termination has been reached, it sometimes occurs that the bones of the fore-legs, unable longer to bear the weight of the body, actually break between the knee and ankle-joint.

As stated above, the disease first makes its appearance in the head and jaws; its immediate seat is in the marrow of the upper and lower jaw-bones, which become carious, or ulcerated. When fever is present in the animal system, it always has a strong tendency to locate in some member which discharges one of the vital, or at least important, functions, and which is, therefore, much in use. It follows from this that the part in most severe exercise is the one most of all likely to be affected, and hence the development of this disease at first in the head and jaws. The constant and severe exercise of grinding the hard, flinty corn irritates and inflames the teeth and gums, and it is in them and in the jaws that the fever in the system makes haste to establish itself. The marrow of the bones in the head is next attacked, changing to a thick and putrid yellow matter. The swelling of the head and jaws is an ulcerated enlargement of the bones,—simply an effort of nature to discharge this matter, and so to throw off the disease. As an evidence of this, a minute examination will show that the bones are filled with a tissue of little irregular cells, or cavities, and that the entire space occupied by the marrow is becoming of a scaly or spongy growth of bone. It is plain that a general destruction of the bony tissue is rapidly going forward. If its progress is not now arrested, this will spread through the whole body. In several cases examined after death by the author, the bones

were all found in this condition. When the marrow is destroyed, necrosis takes place; the bones die, and so does the horse. As might be expected, while the disease is running its fearful course, the poor sufferer becomes dreadfully emaciated.

SYMPTOMS, ETC.

It is extremely desirable so to describe the disease, and to point out its earliest peculiarities, as that all may be enabled to discover it readily, and to protect themselves from imposition. This will not prove difficult. In its very first stages, big head may be easily detected by running the thumb up under the lip, beside the under jaw-bone, between the lip and the teeth. The side of the jaw should be nearly perpendicular with the teeth above. Should there be any enlargement, even as much as the eighth of an inch, let the farmer beware of that horse. Any swelling of the head or upper jaw he can see at the first careful glance. The nasal bone, which lies in a direct line from the eye to the nose, is the one that becomes misshapen and betrays the presence of the disease.

The skin and muscles of the head become fixed, and will not move by pulling the lips. One of the surest indications of big head is a constant sleepiness while standing.

As the disease progresses, the appearance of the poor victim becomes pitiable in the extreme. He is gaunt and drawn up, his hind and forefeet almost together; his head droops and water runs from his eyes; the hair is erect; the joints are stiff, and the skin is dry and hard, and seems very tight. His excrement, which is hard, black, and almost entirely destitute of moisture, is voided with great difficulty.

As has been intimated, the disease in its first stages is not perceptible to the unpracticed eye. It then presents no external evidences by which it may be known, and hence many an amateur trader in horses and mules has been deceived. The unsuspecting owner soon finds that something is wrong; the horse is stiff, and does not move with his

accustomed vivacity and spirit. But his appetite is good Very likely, indeed, he eats voraciously, and this only serves to allay suspicion. A horse with the big head continues to eat until the last moment. When no longer able to raise his head from the earth, the poor creature, lying upon his side, as well as he can, begs for corn; and strange as it may appear, corn—one of the principal causes of the disease—is the only food he wants, and nothing else will he eat.

TREATMENT.

The object of this must be twofold: first, to dry up the humor in the jaws and head; and, second, to free the system from the general effects of the disease. This, of course, can be most easily done in the early stages, yet the disease may often be overcome when it has made considerable progress. It is worth a trial whenever a horse can raise himself to his feet.

Bleeding is the first and indispensable thing to be done. The blood is very thick, almost black, and moves very sluggishly. The veins are congested—often dreadfully contracted. No medicines can be made to operate upon the system while the blood remains in this condition. The mucous absorbents of the intestines are nearly closed, and food passes onward through them undigested. While communication between the digestive organs and the blood is so nearly cut off, it is folly to give medicines. Bleeding thins the blood, as well as decreases its quantity; relaxes the system, and enables the absorbents concerned in the functions of nutrition to perform their proper offices. Medicines can now again reach the circulation and be carried to the extremities by the capillaries. The quantity of blood taken should be from two to four quarts, according to the character of the symptoms. In a bad case the bleeding should be repeated every sixth day, though ordinarily from two to four times, at intervals of ten days, will be enough.

The bleeding having been performed, the practitioner

should prepare about half a pint of corrosive liniment, first taking care to procure an earthen-ware cup into which to pour it. He should apply the liniment to the parts affected with a small mop, made by tying a piece of old cloth on the end of a stick. One table-spoonful on each side of the head and jaw will be a sufficient application, the liquid being always well shaken previously. The parts must be well wet with the liniment, which should then be thoroughly dried in with a hot iron, held near the skin, but not touching it, as actual contact would not only needlessly torture the poor brute, but would destroy the effects of the remedy. The liniment should be applied in this way, every other day, six or eight times; or in a bad case, the treatment may be continued as long as is necessary, varied by omitting the application four or five days at a time in every fortnight. It is important to remember that the digestion of the horse, and not the condition of his head and jaws, is to be the guide in determining what degree of success attends these efforts.

The effects of the disease will be likely to linger in the system long after it has been checked in the parts where it chiefly manifests itself. To remove these effects will be slow work; but it must be done, or the disease will return again, in which case it will almost certainly prove fatal. To remove his stiffness, loosen his hide, and regulate his digestion the following simple prescription should be given: One table-spoonful of stramonia seed—that is, the seed of the "jimson weed," as it is commonly called; or of the thorn-apple, as it is otherwise known—in some meal or bran, every other day, until three or four doses have been administered. It may then be omitted for two or three days. This medication should be repeated so long as may be found necessary.

Many persons, supposing the "jimson" seed to be poisonous, are at first afraid to give it. There is not the least danger, however, in using it as above directed. It has a very happy effect upon the horse's system, and especially

upon his digestion. His excrement, which before was black, hard, and dry, becomes soft, and of a healthy yellow appearance. When this is accomplished, the patient is safe, and not until then, as this will not be the case until the disease is fairly broken. The use of the "jimson" seed will do more to free him from the general effects of big head than all the other medicine which can be given him. Hundreds have been cured by it where no other means were employed.

The author recollects one remarkable case of this sort. Mr. Richard Cross, of Hardeman County, Tennessee, had two valuable horses nearly ruined with big head. He turned them into a cotton-gin lot, of two or three acres, where was growing a flourishing crop of "jimson" weeds, determined that they should eat this or starve. Pressed by the gnawings of hunger, the horses first nibbled away at the leaves, then fed upon the buds, and at last devoured stalks and all. Compassion finally drew his attention to these poor creatures, and to his astonishment he found them nearly well. When turned into the lot they could scarcely drag their feet over a rail, lying on the ground; but now the little negro who first informed him of their improvement, put the case emphatically in these words: "Massa, I tink ole Gray 'most well; he kick up his heels." Years afterward the writer saw the same old gray horse, as well and fat as could be desired.

In case the "jimson" seed can not be procured, a quarter of a pound of sulphur may be given daily, to the amount of three or four pounds. In connection with the sulphur, the horse should have an aloes pill every other day for a week; but the "jimson" seed should be obtained, if possible. No other remedy can be absolutely depended upon, and it is principally to his reliance upon it that the author attributes his great success in curing big head at the South.

The swelling of the head and jaws will disappear very gradually, and if it has been unusually great, the "bunches" will always show to some extent; but it will become less and

less observable each successive year, and, ordinarily, the muscles and tendons will so accommodate themselves to the new condition of things that, after a time, the enlargement can scarcely be detected.

Not less than ten thousand horses and mules, of which the author had knowledge, were cured by this treatment during the years from 1850 to 1858. The cure is radical. When it has once been effected, the horse is no more liable to the disease than *if* he had never had it; nor will any ugly scars remain to proclaim that he was ever unsound.

For the sake of convenience, a recapitulation of the treatment before laid down is here subjoined:

1st Bleed from two to six times, at intervals of from six to ten days, according to the aggravation of the symptoms.

2d. Apply the corrosive liniment every other day, as directed.

3d. Give a table-spoonful of stramonia, or "jimson" seed, daily, with intervals of omission as specified, as long as may be necessary.

4th. In the absence of the "jimson" seed, give proper doses of sulphur, with the aloes pill.

AFTER TREATMENT.

This must be judicious and careful. Unless the object is to kill him, the horse should never be worked while convalescing. When the weather is bad, he should be kept in a warm, clean stable. If pasture is in season, he should be turned upon it during the day, but during cold rains, and on chilly nights, he must be brought into the stable. Should the weather be unusually damp or cold, he should be covered with a blanket. The little blood which a horse in this condition has is very thick, and he is much more sensitive to the cold than when in health.

MODES OF TREATMENT FORMERLY PRACTICED.

A brief sketch of the practices in use at the South for the cure of big head twenty years ago, can scarcely fail to inter-

est the reader. Some of these were barbarous in the extreme, and none had any aim beyond simply checking the swelling of the head and jaws. Of the condition of the general system, or of any remedy for ridding it of the dreadful effects of the disease, absolutely nothing was known with certainty. One of the common, cruel modes of treatment occasionally proved partially successful, but generally they all alike failed. The process was called "putting back the big head;" that is, when any thing was accomplished, which was possible only in the first stages of the disease. Few cases would remain "put back," and, most frequently, the animals fell victims to a subsequent attack.

First in the horrible list of savageries may be mentioned the practice of burning or scalding with a horn filled with a hot mush, made of ashes and boiling water. A common cow's horn, filled with this mush, scalding hot, was applied to the parts immediately over the seat of the disease. The horse's head first being fastened so that he could not move it, the horn was held against it, until the skin and flesh were literally cooked, or sufficiently so to cause them to slough off quite to the bone in a few days. This treatment was sometimes efficacious in the incipient stages of the disorder, but always very much disfigured the poor animals subjected to it; often it killed them.

An equally inhuman practice was to run a sharp, red-hot iron into the jaw, and entirely through the bone. This would likewise check the disease in certain cases, but it produced a dreadfully offensive, running sore, which never healed. The writer has seen many examples of this treatment, and once had two of its victims placed in his charge to experiment with, and, if possible, to cure, but nothing could be done for them. One was shot, as an act of mercy, and the other was given away.

Another singular practice much in vogue was the extraction of one or two of the large molars, or double-teeth, by means of a large pair of tongs, called "tooth-pullers," about three feet long, and in shape like a pair of blacksmith's

tongs. Near the end was a shoulder, so arranged as to take hold of the teeth, which were thus wrenched out. This practice appeared to "put back" the disease more frequently than any of the others, but the horse always suffered irreparable injury from the loss of his teeth, so necessary in grinding his food. The writer has seen at least five hundred horses with their teeth thus extracted, and while some of them were much improved, none were entirely well. They remained stiff and hide-bound, and with much impaired digestion.

But the greatest enormity was the use of arsenic. The plan was to cut through the skin to the jaw-bone, insert a quantity of arsenic with a quill, and then close the wound. A dreadful inflammation and swelling was the inevitable result, the head sometimes becoming as large as a half-bushel. An abscess soon formed, terminating invariably in a running sore, offensive almost beyond endurance. It was no uncommon thing for the flesh and skin to slough off, leaving the bone exposed, when only the utmost care could save the wretched animal from the maggot, the fly, and, at last, the merciful interposition of death. This remedy was, indeed, worse than the disease in its most aggravated form.

Other equally revolting and barbarous systems of treatment were current, but, as these are fair examples of them all, it is not necessary to occupy further space in enlarging upon them.

That these practices can be described mainly as things of the past, must be a source of deep thankfulness to every humane person. They shocked and disgusted intelligent men, even when at their height; and, as the lesser choice of two evils, many horses were given over to die, without the exertion of any effort to prevent it. Still, no attempt was made to introduce a rational substitute, and hence the ignorant horse doctors of that period—or "butchers" as they were often called—had every thing their own way. The people everywhere hailed with gladness the improved modes of treatment, and presented the author with many valuable tokens of their appreciation and gratitude.

SWINNEY, OR INFLAMMATION OF THE SHOULDER.

It would puzzle the very wisest in horse lore to determine where the popular name of this disease originated, or why it was first used. It is utterly unknown to European writers, and has received scarcely any attention from American authors. A more proper designation would be inflammation of the shoulder, as will become apparent from a fuller description. Swinney, or sweeny—commonly so called—is of frequent occurrence in all parts of the United States, but prevails more especially in the South-west, and perhaps most of all in the Valley of the Mississippi.

Its cause may undoubtedly be traced to a very severe strain upon the top of the shoulder, sometimes even tearing loose the strong tendons which connect the scapula, or shoulder-blade, with the back. In this case, the whole framework of the shoulder gives way, the scapula slips down some inches, and the top of the shoulder assumes a sharp and hollow appearance. This is known as slip-shoulder. When in health, the horse readily recovers from the effects of an ordinary strain, with no further care than a little rest; but if there is much tendency to fever in his system, such an accident is very likely to produce swinney.

The immediate seat of the disease appears to be the periosteum, or membranous sheath investing the scapula. If the skin was affected, it would be visible to the eye. Minute examination, or at least dissection, would detect disease in the bones, if any existed, and an abscess or tumor would speedily reveal where the trouble lay, if it were in the muscular portion of the shoulder. There is no doubt, however, that the cartilages and tendons passing over and beneath the scapula are involved, in greater or less degree, as they often suffer great decay.

There are two distinct stages of this disease, a fact which the horseman should fix in his mind by carefully studying each of them. The first stage is characterized by inflammation and lameness, and is sometimes very difficult to distin-

guish from certain diseases of the feet which usually accompany it. Quite frequently the lameness is apparent in the legs and feet alone. The horse seldom stands equally upon both feet, but throws forward the limb upon the affected side to rest it, and his step is short and limping. There is great fever in the shoulder; the flesh becomes hard; the skin adheres to the bone so closely that it can with difficulty be moved at all; the parts shrivel away, and the entire shoulder has a hollow, shrunken appearance. The animal's unwillingness to lie down is a most characteristic symptom, the pain occasioned by the strain upon the muscles and tendons of the shoulder being greater than he is willing to undergo; and when, at length, compelled to do so by sheer exhaustion, there is no mistaking his sufferings and complainings. This circumstance alone infallibly discriminates between swinney and founder, as the foundered horse lies down with ease, and passes more than half his time in a recumbent position.

The second stage is really the beginning of what farmers call big shoulder, a sad affliction, which will presently be spoken of under its own name. It is the sequel of long-continued inflammation, or of unusually severe injuries. In this, the tendons that connect the scapula with the back—having been violently torn loose, or becoming relaxed from the weakening effects of disease—no longer keep the blade in its place, but permit it to drop downward. Disease extends not only to the scapula, but also to the humerus—properly the upper bone of the arm, but often called the lower one of the shoulder. The head of this bone begins to grow, and hypertrophy adds a new complication to the case. The joint becomes greatly enlarged, and from sheer weakness pitches forward, the muscles surrounding it waste away, and this part of the shoulder appears terribly misshapen. The most casual glance at the animal's disfigured condition now reveals but too plainly what has taken place.

One feature of swinney deserves particular attention: that it is almost invariably accompanied by diseased feet. Of all the disorders which indirectly affect the horse's foot, none do

so in greater degree than this. There is an intimate sympathy between the shoulders and the feet, and the diseased condition of the latter has unquestionably much to do with aggravating the symptoms in the former. The hoof rot, especially, is a most frequent adjunct of swinney, and requires direct treatment, as prescribed elsewhere. It will be exceedingly difficult to reduce the inflammation in the shoulder while the feet are diseased, and a permanent cure, under these conditions, may be pronounced impossible.

In the first stages, energetic treatment will be likely to restore a young and vigorous horse to perfect soundness; but the old or feeble can hardly be expected to entirely outgrow the effects of the disease. In the second stage, not much can be done in any case. The patient may be patched up, so as to serve for moderate labor a short time longer; but he will always be weak, sadly disfigured, and in an emergency utterly unreliable.

TREATMENT.

Whatever treatment is adopted, it is obvious that it should have for its object active and powerful counter-irritation. The prevailing inflammation must be brought to the surface. This the corrosive liniment will effectually do. It should be used daily for two or three days, being applied to the affected parts and thoroughly dried in with a hot iron, in the same manner as directed for big head and spavin. Let it be omitted for two or three days, and then employed again. This treatment must be kept up as long as may be necessary to effect a cure, which will generally be from two to four weeks. In order to loosen the skin, it should be rubbed and pulled with the hand every morning. This ought still to be practiced occasionally, and the parts kept well greased, after the liniment has been dispensed with.

In most cases, it will be found beneficial to bleed *once*, taking from the neck-vein from two quarts to a gallon of blood, according to the symptoms. This will tend to prevent the local fever from extending to the general system.

If there is pasture to be had, let the horse be turned upon it. During cold weather or chilly rains he should be stabled, and fed on moist, relaxing diet. On no account let there be any thought of working him until he is quite well.

FORMER MODES OF TREATMENT.

These were all barbarous expedients to produce counter-irritation, the great desideratum in the treatment of swinney. One method was to stab the diseased parts a number of times with a large pegging-awl until they were full of little holes half an inch deep. Another was known as puffing. A quill was inserted into a small incision through the skin, and air blown in. This was pressed along through the cellular tissues with the hand, the skin being torn loose in the process, until the entire surface of the shoulder was puffed out like a full-blown bladder. A third practice consisted in burning the parts in a multitude of ways—with a hot iron, with scalding steam, with a hot mush of ashes, and the like. By these means the flesh was often literally cooked, and in time sloughed off in a mass.

BIG SHOULDER.

As already stated, this is nothing more than an aggravated case of swinney. The flesh and tendons of the breast are affected, as well as those of the shoulder, and shrink away. The diseased growth of bone at the shoulder-joint continues to grow larger, and causes correspondingly-increased disfigurement and helplessness.

TREATMENT.

This, of course, must be the same as for swinney. But a perfect cure is out of the question. True, the animal's sufferings may be relieved, and the disease, in a great measure, subdued; yet, in the majority of instances, it will be found that his usefulness has been entirely destroyed.

When the horse is in health, and in possession of his natural power, the position of the feet is about four inches

in front of a perpendicular dropped from the shoulder. The sufferer from this disease, however, in consequence of the pitching forward of the shoulder, has his feet thrown backward nearly twice that distance, greatly to his detriment in moving, and with the loss of at least one-half his power.

INFLAMMATION OR SWINNEY OF THE HIP.

This is much more rarely encountered than the corresponding disease in the shoulders, which it closely resembles in its general symptoms, particularly as regards the withering of the muscles, the attendant fever, and its accompaniment of diseased feet. From its comparative unfrequency, however, it is not as well understood. It has never been described, except recently, by a few American writers.

TREATMENT.

The treatment must be the same as for swinney in the shoulders, and seems much more efficacious. The corrosive liniment seldom fails to effect a perfect cure.

SLIPPED OR BROKEN HIP.

It would appear as if nature had made ample provision for the protection of the hip-joint. The connection of the three bones of the haunch by powerful cartilages, which encase them on every side; the locking of the head of the femur, or thigh-bone, into a deep socket, or cup, formed in the hip-bone to receive it, and the binding together of this entire arrangement by the strongest ligaments—these, it would seem, should prove sufficient to defy almost every injury. Yet it is quite possible to subject the joint to concussions so violent as to produce dislocation. The head of the femur is wrenched from its socket, and the bone drops downward, giving to the hip a peculiarly slipped or broken appearance. Occasionally, the head of the femur is even fractured. This is treated of elsewhere, under its proper head.

TREATMENT.

Besides allowing absolute exemption from labor, not much can be done. One or two applications of corrosive liniment will assist in keeping down inflammation, and preventing lameness. The shape of the hips can never be restored.

BONE SPAVIN.

There are two kinds of spavin known to the farmer—bog and bone spavin. Of these, only the latter can properly be considered in this connection. The former is described in Chapter VIII.

Bone spavin is an enlargement which appears upon the inside of the hock, just below the joint. It is really a very formidable disease, usually ruining the horse entirely, if not promptly treated. In some instances it seems to do no material harm, although it is always a great deformity; while in others the swelling assumes such enormous proportions that the joint becomes as large as a child's head, and so stiff and lame that the horse can barely step at all.

The joint, at the hock, has a middle bone—from its shape called the cube-bone—resting upon two others below it, of quite different shapes and sizes. Of these, the larger—denominated the shank-bone—is situated upon the outside of the leg. The smaller one, that upon the inside, is known as the splint-bone, on account of its thinness, and because, in its union with the shank-bone, it resembles a splint bound to a fractured limb. The head of the splint-bone is quite porous, and much thicker, as well as softer, than the other portions of it, the bone increasing in solidity and strength toward the lower end. All the various parts of this complicated joint, in common with others throughout the entire frame-work of the body, are supplied with an oily fluid—or synovia, as anatomists term it—which serves as a lubricator to prevent friction and soreness from the movements of the tendons. It also performs an important office in nutrition, as the medium for transmitting the materials necessary to make

good the wear and tear which the joint, from its severe labor, is continually undergoing.

The primary cause of spavin is generally a blow, a strain, or some similar injury. From this results a feverish and unhealthy condition of the synovial membrane, so that its secretion changes into a thick, purulent matter, which Nature, true to herself, makes a determined effort to discharge. But the membrane is so tough and powerful that no outlet can be forced through it. The fluid settles down into the spongy bone below, and a diseased growth of the bone follows, forming a lump, or bunch, on the head of the inner splint bone. Subsequently, the weight and concussion thrown upon the parts, while in active motion, assist in extending the inflammation to all the cartilages incasing the joint.

When only the splint-bone is affected, as is fortunately the case in most instances, the knob, or bunch, is seldom very large, and often admits of a cure. Sometimes, however, the cube-bone, just above, becomes affected also, and bony adhesions are formed between it and the splint-bone, just below. The joint then grows out of all shape, and the animal's lameness is pitiable to behold. For such a case there is no cure. Medicines can not even effect any permanent improvement. The horse is ruined.

TREATMENT.

As for all affections of this class, the corrosive liniment is the best remedy. It should be applied to the parts in the manner directed for big head. After using it daily for four or five days, let it be omitted for the same length of time, and then applied again. This treatment must be continued as long as may be necessary—a circumstance which will depend greatly upon such conditions as how long the swelling has been coming on, how large the bunch has become, and the degree of lameness. If the cube-bone is involved, it will be time thrown away to attempt any treatment. The best thing which can be done, will be to philosophically "accept the situation," and give up the case as hopeless.

Another remedy for bone spavin, and one possessing considerable merit, is the mercurial salve. (See Chapter XXIV.) The parts over the spavin bunches should be anointed with this salve each morning, using either the finger or a small mop. It will be found best to dry it in with a hot iron. If the finger is used, it should be washed as soon as done, as the ointment may injure the nails. This remedy will require several weeks for its perfect action, and must be continued, with the same intervals of omission, as when the corrosive liniment is employed.

No after-treatment will be needed, except good care generally, and rest.

The whole treatment of spavin is simple and plain, yet far from being always effectual. Upon no account let the owner suffer the chisel or mallet to be used for the removal of the knobs, or bunches; nor, if he lays any claim to human feeling, should he think of permitting such barbarous practices as burning with a red-hot iron, or with the horn and hot mush of ashes, nor of consenting to that most cruel savagery of all, the employment of arsenic.

ILLUSTRATIVE CASES.

Two examples, taken from a large number which occurred within the author's practice, will serve to illustrate the different stages of bone spavin. The first happened in 1852, and was that of a fine young mule belonging to Mr. Joseph Holiman, of Gibson County, Tennessee. The swelling was on the left hind leg, the lump being about half the size of a hen's egg. There was considerable soreness of the joint, attended with fever; otherwise, the animal was in excellent condition. Four ounces of the corrosive liniment were used. Treatment was continued about a month, the patient, meanwhile, having perfect rest, after which he was turned out to pasture. At the end of another month he was put to light work, which was gradually increased in severity until he returned to all his old duties again. He never showed any signs of lameness afterward.

The other case was one in which the cube-bone was involved. The victim was a small, compact, sorrel mare—a most beautiful creature—for whom a friend had lately traded, in his over-confidence in the spavin remedy. The joint was at least three times its natural size. Although the corrosive liniment was applied thoroughly, and for a long time, it was without avail. The animal got no better, and, at last, the deceived and disappointed owner was glad to give her away.

CAUTIONS.

A horse is sometimes affected with spavin while no bunch, or, at most, only a very small one, is visible. He steps lame when started after standing for some time; but, as he becomes heated, the ligaments expand and accommodate themselves perfectly to the swollen parts, his lameness passes away, and he moves as freely as ever. Traders, and especially professional jockeys, improve this favorable time for disposing of such animals, and practicing upon the ignorance of customers. The new horse is taken home. After standing in the stable over night, he comes forth the next morning very lame and stiff, and great is the chagrin and consternation of the credulous purchaser to find that a spavined horse has been imposed upon him.

To guard against such deception, the customer should feel the legs with particular care; and if the least unnatural enlargement, or any other suspicious indication, is apparent, let him insist upon seeing the horse in the morning, or at some other time, when he knows the animal has been standing for some hours. Another method is to ride the horse into water, letting him remain there long enough to cool off thoroughly. If he is spavined, he will show it upon coming out, by the stiffness of the joints and a crippling gait. But the best and surest course, when there is any reason to suspect fraud, is to have nothing to do with the beast. Should the bargain seem too good to be lost upon mere suspicion, a trustworthy friend may be consulted, or a guarantee required.

ENLARGED HOCK.

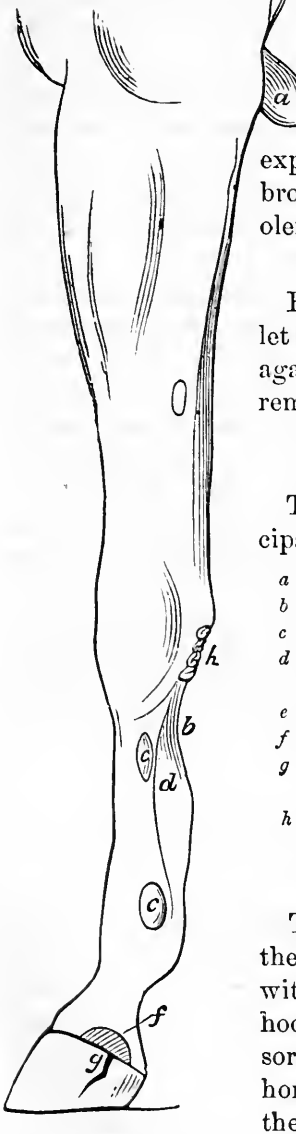
Notwithstanding the extraordinary provision which nature has made for the support and defense of the hock, this joint is very susceptible of injury, through the thoughtlessness or cruelty of man. A bruise or strain is very likely to be followed by inflammation and lameness. These may not prove permanent, a little rest sufficing to set matters all right again. On the other hand, the enlargement may continue to increase, until it overspreads the entire joint.

The horseman must be prepared to encounter two distinct forms of this disease. The first of these is when only the tendons and cartilages are affected, in which stage the symptoms will readily yield to a few applications of the corrosive liniment. The other form is that in which, from a severe blow or concussion, the bone is bruised, its investing membrane—the periosteum—is torn loose or terribly strained, and bony formations take place on the surface of the bone. This is a much graver condition of affairs than the other, and the owner may consider himself fortunate if he can succeed in removing it and restoring the horse to perfect soundness. Sometimes the parts enlarge to three times their natural size, with such stiffness of the joint that locomotion is painful and difficult in the extreme.

TREATMENT.

The treatment must be precisely the same as for spavin. The hot iron need not be used for drying in the liniment, except in cases of bony enlargement.

The practitioner must bear in mind what has been intimated above; namely, that, while the horse may entirely recover from the cartilaginous inflammation, he can not reasonably hope for great or lasting improvement, if there has been much bony growth. True, he can render essential service in checking the disease, and may even qualify the animal for nearly all the labors of the farm; but for the road the horse is utterly valueless. A hard day's work, a severe strain,



or a bruise, may bring back the old trouble at any time.

BROKEN HOCK.

The cap of the hock forming the outer part of the joint is much exposed to injury. It is occasionally broken through some extraordinary violence.

TREATMENT.

For this there is no treatment but to let the horse rest until the bone knits again. Use the corrosive liniment to remove soreness

EXPLANATION OF THE CUT.

The cut represents some of the principal causes of lameness in the fore-legs.

a Enlargement of the joint of the elbow.
b "Tying-in" of the leg below the knee.
c The most frequent situation of splint.
d An aggravated case of the enlargement accompanying sprain of the back sinews.
e The situation of wind-galls.
f The first appearance of ring-bone.
g The situation of sand-crack in the fore-leg. (See Chap. IV.)
h The situation of what veterinarians call mallenders.

RING-BONE.

The coffin-bone, so-called, is properly the bone of the foot, occupying the space within the hoof (whence its name, the hoof being its coffin). With the suspensory ligament that surrounds it, and the horny substance of the hoof, it composes the foot. At its upper end, which is on a level with the top of the hoof, is the lower joint of the leg,

called the coffin-joint. This bone is very soft, and filled with a multitude of little interstices, through which pass the blood-vessels of the feet. It is very subject to both disease and external injury.

When it receives the latter, the lubricating fluid, or synovia, of the coffin-joint becomes diseased, and, settling down into the spongy bone below, a bony enlargement is the consequence. At once the foot begins to show a gradually-increasing lump, or bunch, at the point where the hair and hoof join. Its development is chiefly laterally, and thus it finally encircles the entire joint; hence the term ring-bone.

What is known as club-foot is simply ring-bone at its worst stage. In this condition, the horse is nearly useless for general purposes, while the hope of a cure is so remote that he is hardly worth any pains at the practitioner's hands.

TREATMENT.

Ring-bone admits of a cure only in its earlier stages. Even then it is effected with difficulty, and can seldom be relied upon as permanent, as a strain or a contusion may bring back the affliction at any time. Still, there is always a fair prospect, at this period of the disease, that the horse may be made fit for some years of moderate service.

The treatment must be the same as for spavin in every particular. Above all, the horse must have a long continuance of unbroken rest.

STIFLE.

No joint in the horse's structure but is liable to strains, bruises, and similar hurts, and, although one of the strongest in his whole frame-work, the stifle-joint forms no exception to the general rule. It is sometimes badly wrenched, generally from the leg becoming fastened or hung in a false position. Swelling, inflammation, and the most painful lameness succeed. In some parts of the country this is popularly called stifle, by which it is meant that the patella—the small bone of the joint, corresponding to the knee-pan in man—has been dislocated.

This opinion is assuredly erroneous. Dislocation may be regarded as an impossibility, unless the tendons which bind the joint together have been first either cut or torn apart. Were such displacement of the patella to occur, it is little likely that the animal would ever step upon that leg again. The writer has examined and treated a large number of horses said to be stifled, but in no single instance was he able to discover satisfactory evidence of dislocation. Swelling at the stifle-joint is exceedingly conspicuous; and from this circumstance, together with the slow progress of the patient's recovery, the uninformed are deceived into the belief that there must have been some displacement.

TREATMENT.

Counter-irritation is the only treatment which can be of the least benefit. To secure this, let the parts be well rubbed with the corrosive liniment, until it has been applied three or four times each alternate day. Rest and the reparative energies of nature will do the remainder. It may be months, perhaps, before the horse can be worked again; but on this point, as in all similar cases, the owner must be patient.

Perhaps the joint never becomes as strong as it was before sustaining the injury. There is an equal doubt whether the animal is not more liable than formerly to the same disablement. Good grounds for hope do certainly exist, however; for not a few so-called "stifled" horses have been restored to unimpaired and permanent soundness.

SPLINT.

This is a bony enlargement upon the inner splint-bone, whence its name. In its origin, symptoms, and development it is nearly identical with bone spavin, from which it differs in no marked respect, except as regards location. This comes upon the side of the bone; the other, at its head. It is, however, a much less formidable disorder than spavin. The enlargement seldom attains any great dimensions, and, in a large majority of cases, none of the important ligaments

are involved. It usually occurs upon the fore legs, but is sometimes seen upon the hind ones also—in either case, upon the inside, of course.

Splint is caused by a blow or contusion, most commonly by the horse himself striking the leg with the opposite hoof, by which means the periosteum is injured. The office of this membrane is to separate the skin and underlying cellular tissues from the rough surface of the bone, and, also, as before stated, to act as a vehicle for the nutrition of the latter's entire structure. These functions are necessarily deranged when the periosteum is seriously bruised, or is torn loose from its proper connection; and the bony secretions—consisting principally of phosphate of lime, and which, in the natural arrangement, are distributed throughout the cellular tissue within the bones—are deposited upon the surface, forming a lump beneath the skin. Soreness is occasioned, at first, while the membrane is painfully stretched by the unnatural enlargement of the bone; but Nature usually accommodates herself to the new condition of affairs, so that, in time, this entirely disappears.

Occasionally, splint shows itself upon some part of the leg where it interferes with a large tendon, or it may appear immediately on the joint, in either of which cases, of course, it causes lameness; otherwise it does but little harm, further than its unsightliness is concerned.

TREATMENT.

After the horse reaches the age of nine or ten years, splint almost invariably disappears so far as to be hardly noticeable, and, in most instances, it may be as well to let it alone. If treatment is decided upon, however, the corrosive liniment may be applied two or three times, as directed for spavin, to remove the soreness and lameness.

BROKEN KNEES—STUMBLING.

Stumbling can not properly be reckoned among the vices of the horse, notwithstanding most writers classify it as such.

It is simply either the effect of some disease of the shoulder or of the lower joint of the leg, or is a bad habit resulting from defective structure.

In the latter case, the trouble arises from the feet being too nearly in line with the direction of the leg. From the hoof to the upper pastern joint, the ankle should incline at an angle of about forty-five degrees. Sometimes, however, one meets with a horse whose ankle is stuck straight down into the top of the hoof, like a post in the ground, the hoof being erect and round like a cup. Such an animal is almost sure to be a noted stumbler. It would be folly, indeed, to buy or trade for him without first critically examining his knees, and making minute inquiries as to his habits.

The habitual stumbler is not only slow and uncertain in his movements, but is really dangerous in nearly every capacity in which he can be used. If he is under the saddle, the rider runs a constant risk of being pitched over his head and carried home with a fractured limb or a broken neck. In the wagon, he is almost sure to fall while ascending the steepest hill, and when, of course, his services are most needed. Not content with simply breaking the shafts, when hitched to a buggy or carriage, he has the most exasperating fashion of going through with his peculiar evolutions in the midst of the largest crowd to be found in the whole day's travel, when one's feelings are most likely to be mortified by such awkwardness. To drive him by the side of a young or skittish horse would be almost sure to end in a runaway, from his companion's fright when he falls down.

There is but one place for the stumbler. That is in the plow. Here he can do no harm, if hitched up alone, or with an old or gentle horse. Beware of a stumbler. His possesssor is cheated, no matter how low the terms upon which he is purchased.

SWAY-BACK.

This is not a disease, but a deformity, produced by persons jumping upon the back of the young colt before it is strong

enough to bear such a weight, and thus bending downward the soft, unformed bones of the vertebra, whose points are pressed together above and strained apart below. The back is not broken, but terribly bent, and by the animal's growth is permanently fixed in this condition. Such a horse may be quite serviceable, and the back-bone seem but little weakened; but he is never adapted for rapid motion of any kind, and his disfigurement is so marked as to detract materially from his market value.

For such a case no treatment is possible. Nature will do all that can be done. The foolish practice which causes sway-back should be discontinued altogether. It is early enough to begin riding the colt when he is nearing the close of his second year. At that age a small boy may be permitted to get upon his back carefully, but a full-grown man should not attempt to do this for several months later.

CHAPTER IV.

DISEASES OF THE FEET.

ULCERATION OF THE FOOT; OR, NAVICULAR DISEASE.

THERE is one species of lameness to which the horse is subject that has puzzled the farmer and scientific practitioner not a little. Very little is known in relation to it, beyond its external developments. It is not very frequent, yet sometimes occurs. The only wonder concerning it is, that it is not found in much more frequent operation.

The horse is discovered to be lame; but what the part is that is affected is the question with the owner. The trouble sometimes seems to be in the foot, and then again in the shoulder. At times the animal limps, as though pricked by a nail. After a while the lameness passes away so nearly that it is scarcely noticeable; but presently it returns worse than ever. All this time a disease has been establishing itself in the back part of the foot—the heel—which, if neglected, will ruin the horse entirely. This has been called the disease of the navicular joint.

There is a bone lying between the coffin-bone and lower pastern, which, extending some distance back of these, forms the projection of the heel, and rests upon the frog. It is denominated the shuttle or navicular bone, the latter name being given to it on account of its supposed resemblance in shape to the outline of a ship. Its use seems to be to impart increased solidity to the connection between the coffin-bone and the joint above, and to enable the flexor tendon which passes over it, and is inserted into the bottom of the coffin-bone, to act with more power and pliancy in giving strength and motion to the foot. It forms a sort of joint with the tendon and other bone.

The navicular bone and joint are liable to various injuries, and especially to strains and bruises. They are also very apt to become involved in all cases of injury to the frog, which is much exposed to accident. It is cut or bruised in traveling over stony roads. The careless smith frequently neglects to pare it off, and permits it to grow until it presses upon the ground; or else knows no better than to pare the hoof behind a great deal too much, by which species of malpractice the heel is made to drop too low, and the unprotected frog thrust upon the ground. It is often wounded by sharp stones, points of frozen earth, and the like.

A. Os saffraginis.
B. Os coronæ.
C. Os pedis.
D. Os naviculare.
E. Perforans and perforatus tendons.
G. Inferior sesamoidal ligament.
H. Cleft of frog.
I. Side of frog cleft.
J. Sole.
K. Crust.
L. Coronary substance.

From these causes a settled disease of the joint is apt to be produced. Deep-seated ulcers occur, and the membrane and tendon are eaten away. An abscess is sometimes formed, which breaks, at length, and copious discharges of matter continue for a long time. When this happens, the horse may recover, as this is the very end always to be sought in

any mode of treatment. Such cases, nevertheless, always prove exceedingly obstinate. But in most instances the disease takes an entirely different turn. No abscess is formed, but the navicular bone becomes diseased, and commences to decay; the hoof shrinks, the portions toward the back of the foot being drawn together; and now the horse suffers from what farmers call "narrow heel."

Still another fearful development of the disease may take place. In this the bone begins enlarging, the disease then assuming the same features as ring-bone and spavin. Adhesions between the bone and the lower pastern, and also with the coffin-bone, presently follow; and eventually the foot is ruined, when the horse, of course, is worthless. The final history of such a case, which is well worth tracing out, is about as follows: Enlargement of the bone goes on; the deposits of bony matter upon the surface increases, and the three bones above named are consolidated, forming a soft and spongy mass of bony matter, which presses the hoof out in all directions. To such a size does this unnatural growth attain, that it often looks more like the head of a maul than any thing else. Hence the name club-foot, which applies to the incurable stages of this disease and of ring-bone alike. What horseman is there who is not familiar with this monstrosity and its deplorable effects?

TREATMENT.

The whole philosophy of this is simply to produce an external development of the disease, by the formation of an abscess situated near enough to the surface to readily force an outlet for the discharge of its purulent matter. If this can be done, there is reason to be hopeful concerning the final result; if otherwise, the horse is ruined forever. The most powerful counter-irritation will be necessary in the region of the heel and the entire back part of the foot. Too much can not well be done in this direction. An inflammation must be occasioned upon the surface superior to that of the deep-seated disease of the joint and bone.

No remedy can be employed so efficient for this purpose as the corrosive liniment. In addition to producing a quick and active irritation, more powerful than any possible substitute, its superior properties as a volatile, penetrating liniment make it just the remedy needed. If any thing can reach the seat of the disease, this will do it.

Apply the liniment to the heel and back part of the foot, and also to the bottom of the latter and to the frog. Examine carefully the bottom of the foot, to see whether it has begun to decay. If so, cut out as much as possible with a chisel or knife; after which apply the liniment freely, drying it in well with a hot iron. The twitch must previously have been put upon the animal's nose, to make him stand still, and the medicine thoroughly heated. Make the application of the liniment every other day, and continue this course until the horse is well. When the ulcer breaks and matter begins discharging, you may feel assured that the disease is mastered. After this, a cure is only a question of time.

Keep your horse in a cool, dry stable; or, if pasture is in season, let him run on the grass. During cold rains, be certain to have him in the stable, and always keep him out of the wet while the liniment is being used. If his condition is not good, bleed once, and give a pound of sulphur in a bran-mash, or in some boiled oats, or in his cut feed. Make four doses of the sulphur, and give one of them every second day. If he refuses this food, let him have nothing else until he does eat it. A little abstinence may be of benefit to him

THIS DISEASE THE CAUSE OF MANY OTHERS.

This disease is quite commonly the cause of many of the other affections of the feet. It has a great variety of developments. We will mention some of the different diseases which may have their origin in this. One of these is ring-bone, in which the bone grows out in front. Foot evil is another. In this there is a general oozing out of the dis-

eased matter all around the top of the foot, through the coronary ring. Contraction of the hoof, or narrow heel, is usually the result of caries, or decay of the bones of this joint, the back portions of the hoof dropping in together. Thrush is but the beginning of foot evil, the purulent matter collected at the joint escaping through the heel and frog of the foot. Greasy heel is a case of enlarged thrush, and often from the same causes. Hoof rot, or pummiced feet, often accompany navicular disease. Cracked hoof, or sand cracks, proceed from brittle hoofs, which this ailment produces.

It must be understood that these diseases may have an origin independent of that which we are now considering; but in a majority of cases they are found in connection with this joint disease, and in a large number of instances are produced by it.

CRACKED HOOFS.

This is otherwise called sand cracks, from the prevalent opinion that such cracks occur in sandy regions much oftener than elsewhere. Such is not the case, however. This belief has obtained from the fact that these cracks are liable to become filled with sand, when they are always very troublesome. Of course, where there is no sand this circumstance does not happen. Cases of this kind are comparatively rare in this country, so much so, indeed, as scarcely to call for any mention here.

Cracked hoof is consequent upon a long-standing diseased and feverish condition of the feet, from which causes the hoof becomes hard, dry, and brittle, until, at length, it splits open. The elasticity and toughness of the healthy hoof are gone. Narrow heel is another cause of cracking, when fever has made the hoof hard and dry. The back of the heel drops in, which naturally occasions cracking in front. Hoof-rot produces the same effect. The decay of the bottom of the feet is sometimes very great, leaving but a mere shell of the hoof, the sides of which have become very thin and brittle. When the horse has been kept shod for a long time, and the

smith has neglected the necessary paring when removing the shoes, the hoof, especially during rapid motion, is very apt to split in the quarters. This generally takes place on the inside of the hind part of the foot. In this it differs from contraction, which, as we have seen, usually causes the crack to come in front.

The fore-feet are more subject to cracks than the hind ones. Founder does the mischief here. It is the general cause of brittleness. Brittleness produces contraction, and contraction splits the hoof. All these diseases often exist, and no crack occur. But hoofs thus diseased are much more liable to crack than others, and when cracks do take place in them, we may be certain their true causes are those here indicated.

Cracks in the front part of the hoof often extend to the top, or the coronary ring. They are not of uniform depth, sometimes penetrating only part way through the hoof. In this case, they do but little harm, and, with a good shoe, the horse will do excellent service for years, if used moderately. The only danger seems to be the liability of the crack to deepen to the sensitive part of the foot, when it inevitably causes lameness. When it is situated in the quarter, it seldom extends more than half way up the hoof, yet it may be deep and sore.

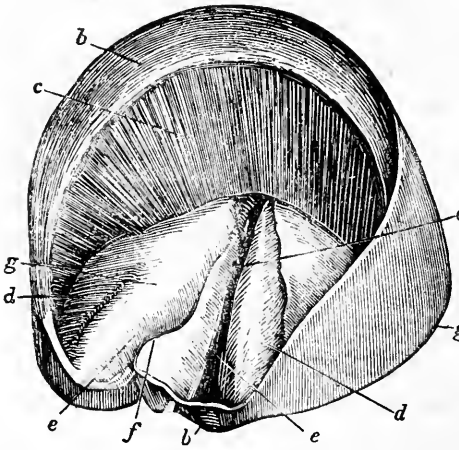
TREATMENT.

There is but little difficulty in effecting a cure, which is only a question of time. Remove the disease which is its cause, and the crack will readily heal over. The former, then, is the first thing to be accomplished, and when this is effected the crack will generally get well of itself. If the crack is in front, file off its edges nearly to the bottom. Then lay a narrow strip of canvas cloth, about an inch in width, lengthwise over it, and, outside of this, still another, covered with a thick coating of adhesive salve, or of pitch. Care should be taken that no sand or dirt is left in the crack, under the cloth.

At the top of the crack, if it extends only part way up the

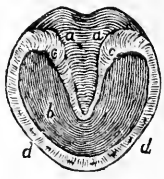
foot, burn the hoof with a hot iron, from its top to the top of the crack, and on each side of the latter for the space of one-fourth of an inch. Burn the hoof to a crisp down to the live flesh, and should the crack seem inclined to split open when the horse steps, let the smith drive a nail through the bottom of the hoof, so as to rivet the divided parts together. The nail should be clinched in the same manner as when driven through the shoe, and its head and point filed off smooth. Sometimes it will be found best to use two nails—one at the bottom, and the other part way up the hoof. A small seam may be cut on each side of the crack to receive the upper one, and the nail driven through and clinched. Care should be taken that no dirt or sand be left in the crack, and then a coat of pitch spread over the entire opening.

THE FOOT.



a The external crust seen at the quarter.
b The coronary ring.
c The little horny plates lining the crust.
d The same continued over the bars.
e e The two concave surfaces of the inside of the horny frog.
f That which externally is the cleft of the frog.
g The bars.
h The rounded part of the heels, belonging to the frog.

This smaller cut exhibits, in as satisfactory a manner, the mechanism and structure of the base of the foot.



a a The frog.
b The sole.
c c The bars.
d d The crust.

This will prevent the split from extending higher up. A horse should never be used while suffering from cracked hoof, except for light purposes; and if the crack is through to the sensitive part, he should have entire rest until quite well.

The time necessary to heal the crack will depend, of course, upon its extent and depth. The hoof will grow out a little more than half an inch per month. By simply measuring the length of the crack, any one can compute the length of time it will require to complete the cure. Meantime, if the adhesive cloths come off, put on others. In some cases it may be well to put on the shoe. In quarter cracks they should always be fastened together at the bottom with a nail or rivet.

HOOF ROT.

What is generally known as tender feet is one of the most common afflictions to which the horse is subject. No animal has tender feet unless they are diseased or worn off. When in a healthy condition, the hoof is very hard and tough, having a bluish or limestone color, and is admirably adapted by Nature to resist the injurious effects of the severe concussions which they necessarily undergo. Instead of the term "tender feet," it would be more correct and explicit to use that of "hoof rot." This is what the disease really is. By the operation of a kind of dry rot, which produces a feverish state of all the parts, the hoof and bottom of the foot decays or perishes away. The primary cause is a diseased condition of the feet and legs.

Hoof rot is found in connection with spavin, ring-bone, swinney, foot evil, and often with the disease of the navicular joint. It seldom fails to accompany chronic founder. While these diseases often occasion hoof rot, they, upon the other hand, are as frequently excited and brought on by it; and, in a majority of cases, spavin, ring-bone, and foot evil would not occur were it not for this predisposing cause. When the spavin or coffin-joint is injured, the horse would

generally recover, in all probability, if the feverish influences arising from the diseased condition of the feet were not so much against him, and which, constantly irritating and exciting the joint, finally settles upon it a permanent local disease. Not unfrequently, however, the disorder has an existence independent of any other, being the consequences of bruises or wounds which the foot sustains in traveling over hard, rough roads, or from their becoming worn off. Among other causes of the same nature, are such as permitting the shoe to remain on too long, or keeping the horse constantly shod, and compelling him to stand in a wet, unwholesome stable.

SYMPTOMS.

The disease may be recognized by the dry, chalky appearance of the bottom of the feet, which may be easily dug out with a knife or chisel. The frog of the foot is obviously diminished in size, and the joints, especially the ankle-joint, become swollen, when the horse remains standing for any length of time. The steps are short and lame, indicating plainly the soreness of the feet, the affected member being put forward, and thus rested; or, if both feet are diseased, the horse will advance first one foot and then the other. In most respects the symptoms resemble those of swinney, which hoof rot very commonly accompanies, and for which the inexperienced horseman is very apt to mistake it.

TREATMENT.

When the disease exists alone, the corrosive liniment will always effect a cure; but in case it is only the result of another disorder, that must first be cured before commencing the direct treatment for this.

Clean off the bottom of the feet, dig out the pumiced, chalky matter, and pare down the sides of the hoof and also the frog. Wash the bottom of the foot with the liniment each morning for three or four days in succession, always drying it in well with a hot iron. Omit the application for two days, and then continue as before.

This disease does not usually unfit the horse for moderate service, but care must be taken to keep him out of the wet while undergoing treatment. After a few weeks he may be safely returned to full duty, and shod, if necessary.

CORNS.

These are the great bugbears of the stable. Lameness in the feet forms such a common complaint among horses, that the stable-keeper can not evade the demand upon his fancied attainments in horse lore for the explanation of the phenomena in some way. It is, therefore, customary with many men, when any thing is the matter with the horse's foot which they are unable distinctly to account for, to get rid of the difficulty by pronouncing it to be corns. Some practitioners, by no means backward in claiming scientific proficiency, have made the same mistake, much to the detriment of their professional reputation.

An instance of this was afforded in the spring of 1866, in the case of a beautiful trotting-mare, belonging to a gentleman in Cincinnati. For a long time she had been under professional treatment for corns; and yet, when the writer was called to examine her, it was the task of but a few minutes to demonstrate the fact that she was suffering from nothing less than the dreadful disease of the navicular joint.

We have never found any affection of the horse's foot which could properly be termed corns, but have treated scores of cases exhibiting the peculiar condition of heat and soreness which is known as such. This is a redness and inflammation of the bottoms of the hoofs, generally having its commencement in the quarters, on each side of the frog. It occurs oftener in the inside than on the outside quarter, and in the fore-feet than in the hinder ones. In all cases that we have examined, it is an accompaniment of hoof rot. The bottoms of the hoofs decay until the disease reaches the sensible portions of the foot, and the blood settles down in patches, ramifying in all directions in little lines, which give

to the parts a peculiar blood-shot appearance, and form what have been mistaken for corns. The latter name has no proper applicability, and seems to have been adopted simply because none better was known. At any rate, it is the offspring of the prevalent ignorance concerning that condition of the feet just described.

Corns, so called, are nothing more than the soreness caused by hoof rot—one development, or another edition, of that disease. They belong to the same family, and have the same pedigree, so to speak, as thrush, grease, foot evil, and narrow heel.

A more serious result of this diseased condition of the foot sometimes occurs. The inflammation reaches within the horny sole of the hoof, and ulceration takes place there. The abscess thus formed forces a vent, sometimes through the heel, but oftener through the coronary ring at the top of the hoof. Here the disease assumes different phases. Sometimes it runs into foot evil, and, extending entirely round the foot, brings the hoof off altogether. When the abscess bursts forth in the form of a running ulcer, it often rises and breaks a number of times, and may continue discharging for months.

TREATMENT.

As the state of the feet whence corns proceed originates from hoof-rot, the remedy must be the same as for that complaint. Cure hoof rot and the corn will disappear. If an abscess has not yet been formed, the corrosive liniment will right matters without difficulty. Remove the shoe, and pare the hoof down as far as can well be done. Pare down the frog, also, and dig out all the chalky, pumiced hoof; then apply the liniment to the heels and the bottoms of the feet, using a hot iron to dry it in thoroughly. Repeat the application five or six times; but it will not be necessary to use the hot iron more than once in drying it in at the heels, though at the bottoms several times.

In the summer of 1866, the writer treated a case of corns in a horse belonging to Mr. Early, of Petersburg, Boone

County, Ky., which was one of the worst he ever saw. The rotten, pumiced hoof was, at least, half an inch in thickness, and extending back over half the bottom were a number of angry-looking patches, while the sole, at each point of the quarters, was perfectly blood-shot. The case was fast hastening to the still worse determination of cracked heels, or grease. The leg was badly swollen as far up as the hock-joint. For this swelling, the animal had been under professional treatment for some time previous, the real cause of lameness, situated in the foot, remaining entirely unsuspected. After only three weeks' use of the corrosive liniment, the animal was nearly well, and the swelling hardly perceptible. A continuance of the treatment in due time effected a perfect cure.

CONTRACTION OF THE HOOF, OR NARROW HEEL.

In all parts of the country, there are numerous cases of contraction of the hoof, or narrow heel, as it is popularly called. The shape of the hoof is nearly round when the foot is in its natural or healthy condition; but sometimes the hoof becomes elongated, the toe extending forward, and the parts toward the heel dropping in together.

It is a prevalent opinion that contraction is the result of shoeing; but this is certainly a mistake, because otherwise the trouble must occur much oftener than it does. There is no reason why the same causes, operating in the same manner, should not more uniformly produce the same effects. Not one in twenty that is kept constantly shod is ever troubled with contraction. This is not itself a disease, but merely the result of an unhealthy condition of the feet.

So long as all the parts included within the hoof are in in their natural state, the hoof will remain natural and solid; but let decay commence, no matter from what cause originating, and the parts shrink away, the sides of the hoof will fall in, and the whole foot seem misshapen. Narrow heel has just this history, and no other. The hoof often assumes great irregularity of outline. One side drops in more than the

other; the lower parts of the heel turn in, or, it may be, bend outward, or the toes are elongated beyond all proportion. In all these cases, the hoof is being burnt up with fever, and, like a crisped horn, twists about in a variety of shapes.

TREATMENT.

We know of nothing which can properly be called a remedy; contraction will cease when the disease that caused it has been cured. Paring may, perhaps, be of some advantage. Of all the forms of shoeing recommended, none are of any practical benefit.

The horse's usefulness is not always essentially impaired by contraction of the hoof. Though incapacitated for rapid motion, he may still do very good work, perhaps, in the plow or wagon.

INJURIES TO THE FROG.

The frog is a part of the horse's foot peculiarly exposed to injury. From its location, it is continually brought into contact with many hard substances—sharp stones, or sticks, roots, nails, points of frozen earth, and the like.

It is a soft, elastic substance, capable of considerable expansion and contraction, and acts as a protection to the important bones and tendons of the heel—principally the shuttle, or navicular bone, and the flexor tendon, that gives motion to the foot. Upon the surface it is insensible, but, by paring it away, the sensible part is soon reached. It is the latter which receives the hurt from the sharp substances above referred to. Fever and soreness spread through the adjacent parts, terminating frequently in deep-seated and obstinate ulcers. Lameness may exist for some time before its location and cause are discovered. The frog should be kept well pared. Its natural appearance is very much like that of India-rubber—dark brown in color, and without cavities, splits, or fissures of any kind. If any dark spots are detected in the horny substance of it, it is an evidence of stone-bruise.

TREATMENT.

The corrosive liniment will remove all traces of stone-bruise and similar injuries, and heal the sore and wounded parts.

INFLAMMATION OF THE FEET, OR FOUNDER.

Certain attacks of inflammation, which frequently make their appearance in the horse's feet, have received the name of founder, but for what reason it would be extremely difficult to say, since there is not the least apparent connection between the term and that to which it is applied.

The common theory among farmers is, that the horse becomes foundered from over-eating, or from drinking too much water, the founder descending suddenly to the feet. The disease is known by a variety of names in different sections of the country; for instance, water-founder, corn-founder, grass-founder, and others. As to a cure, these persons imagine that the great object is attained if the founder can be restricted, and kept from settling down to the extremities of the limbs.

In reality, however, the founder is not only in the feet already, but has probably been established there for days, or, perhaps, even for weeks. The sensible portion of the foot within the hoof, and the bones in the immediate vicinity—the coffin, pastern, and shuttle bones—are filled with little blood-vessels, which supply these parts with materials for their nutrition. The inflammation to which this region is subject is unusually acute in the case of founder, and is liable to be developed very suddenly.

The real cause of founder, then, is the previously-diseased condition of the feet, which the horse's excessive eating and drinking does no more than to aggravate and bring into powerful action. As in all inflammation, swelling attends the fever and soreness, and the parts within the hoof become so painful that the horse can hardly bear to step at all. Inflammation is next communicated to the hoof itself. It is

forced outward by the swelling within, and grows out of all symmetry, until the horse is completely ruined. Who has not seen the dreadful results of founder in the wide-spreading hoof, the toe turned up, or elongated, sometimes even six or eight inches, and the bottom of the foot flat and smooth?

There are other circumstances that give rise to founder of more frequent operation, in many sections, than over-eating and drinking. The horse first overheated, and then allowed suddenly to cool; or brought from the cold and wet into a warm stable, where his feet are enveloped in straw and hot dung; or ridden or driven very hard in the cold, and, after standing hitched to a post, fetlock-deep in mud, removed to a warm, close stable, a horse thus treated is a fine subject for founder. The feet are chilled in the cold, and heated in the stable, and it would be surprising if they could continue long to stand such usage. If fairly treated, and not otherwise diseased, the horse will never have the founder.

One disease of the feet, generally occurring in the fore-feet, is so commonly found associated with founder, that it is difficult not to believe that it is the principal cause of the mischief. In hundreds of cases of founder examined by the writer, there was not one entirely free from hoof rot. In most cases this had been working for weeks, or even months, before. The evil consequences of this condition of the feet have been greatly overlooked.

To sum up the matter, we record it as our opinion that, if the feet of the horse are not previously diseased, and have not been bruised or otherwise injured, there will be no founder; that what is known as founder is only a very high and sudden rise of inflammation in the feet from a disease already existing there; that hoof rot is the cause of chronic founder, or established inflammation of the feet, and nine-tenths of all the cases of founder which occur; and that many a lameness in the horse, which receives no attention from the owner, is an evidence of the existence of disease, which may develop into chronic founder under any one of a variety of unfavorable circumstances to which the animal

is frequently exposed, not to mention the evils following the unnatural shape and enlargement of the foot.

SYMPTOMS.

These are variable. Sometimes they are well marked, the horse indicating the nature of his sufferings with unmistakeable plainness; but not unfrequently they are so obscure as to be mistaken or entirely overlooked. The first noticeable sign is the horse's restlessness and the frequent shiftings of the fore-feet. The pulse is quick and hard, the nostrils have a red and florid appearance, and the horse indicates his condition of extreme suffering by an anxious, woe-begone look, with repeated or heavy grunts. He does not stand long upon his feet, and yet can not lie down in the natural manner; but, after making several efforts to do so, he will rise up, turn round, change his position, and then resume his feints of lying down. Sometimes these efforts will be repeated three or four times before he accomplishes his object, which he finally does by dropping to the ground like a log. The stillness with which he lies upon his side is proof at once that the attack is not one of colic; while his changed look of relief and comparative ease declares, as plainly as words could, what his disorder really is. After a time he rises upon his haunches, to get up, but, overcome with the pain in his fore-feet which the effort occasions, he suddenly drops upon his side again. Putting his head around to the feet, he rests his nose upon them, as if to point out the seat of his acute pain, and to plead, as well as he can, for some relief.

TREATMENT.

Bleed in the neck vein, without delay, as soon as the animal's condition is discovered. Let the blood run freely, taking at least a gallon of it. The object of this is to draw away the blood from the overloaded blood-vessels of the feet. Many object to bleeding in the neck, as being too remote from the seat of the disease. Experience, however, is

a safe teacher, and one not easily misunderstood. Hundreds of cases, within the personal knowledge of the author alone, have fully tested the great benefits of this practice. We are satisfied that the desirable results of bleeding depends, not so much on the quantity of blood taken, as upon its determination in another direction. Hence it is quite in the natural order of things that the feet should be relieved by this bleeding.

The bleeding having been attended to, have prepared a kettle of hot salt and water. Drench him with a quart of this liquid, as hot as he can bear it, and next bathe his feet and legs with it. Rub these well with a rough cloth or brush. Make this application three or four times in the course of an hour, and after this, as soon as the feet have become dry, wet the parts just at the edge of the hair with the corrosive liniment, or, in the absence of this, use turpentine. Do not attempt to work the animal until he is entirely well. Feed lightly on bran-mash, boiled oats, cut feed, or a little scalded meal. If pasture is accessible, however, he need have no other food. Not only is this the best diet for him, but it is Nature's own medicine; and in fine weather, the cool, moist ground will act as an excellent poultice to his feet. In stormy weather, the horse, with this or any other disease, should be kept in a good, dry stable.

Having happily got the founder under control, you had now better set to work to cure his feet entirely, or, in all probability, the disease will return presently in a worse form than before. Hoof rot is what you now have to combat, and must be treated directly as prescribed for that complaint.

For an old-standing or chronic case of founder give the following: One pound of the flour of sulphur, one-fourth of a pound of cream of tartar, the same of saltpeter, and half a pint of pulverized "jimson" seed. Make six doses of this, and give one of them each day until they are all gone. At the same time, there must be energetic treatment of the feet, using the corrosive liniment as elsewhere directed.

Another remedy for founder, which comes to us from high authority, is to split open with a sharp knife the little point, or knot, in the long hair at the back of the fetlock. This is said to afford almost instantaneous relief.

There is probably but one other disease (colic) with which the horse is so commonly affected as with founder. More poor, thriftless, shadowy horses may be found lingering along, in constant suffering from chronic founder, than from all other causes combined. The disease may be cured, if taken in season, and old standing cases may be greatly relieved; but there always remains more or less predisposition to the old trouble. A young and vigorous animal is likely to pretty nearly outgrow the disease, but there is much less hopes for this when an old horse is taken with it.

CHAPTER V.

DISEASES OF THE GLANDS AND NASAL MEMBRANES.

BLIND STAGGERS.

BLIND STAGGERS *proper* is peculiar to the Southern States In the form in which it there exists, it is not found north of the latitude of thirty-six. What is known by that name in the Northern States and in Europe is not properly blind staggers, and is attended with but few of the dreadful symptoms of the disease as it manifests itself in the South. In the North, and in Europe, numerous affections of the horse that produce sleepiness or giddiness—most forms of vertigo and slight attacks of apoplexy—are all vaguely termed staggers. It is true that these often cause a staggering gait; but they are accompanied by none of the other characteristic symptoms of blind staggers.

We are satisfied that neither the people of the Northern States, nor even the best informed writers on the horse, have any knowledge of this dreadful scourge of the cotton States, where, in former years, it prevailed to a terrible extent. At one period—from 1848 to 1854—its ravages were especially destructive, and became really fearful to contemplate. Certain sections of the country were nearly depopulated of the working stock, and, what was worse, they were sections where the people were the least able to bear the loss. It broke out much more frequently on new plantations, where the ground had been under cultivation but a short time, than in the older and more cultivated districts.

During the long residence of the author at the South, much time was spent in the careful study of this disease, and nearly all parts of the cotton States were visited, for the purpose of gathering facts in relation to its manifestations in different

sections. These investigations were necessarily pursued without much light or aid from others. The best descriptions given of it by recognized authorities in veterinary science, fell far below the dreadful developments of the malady as they were presented to the author's observation almost daily. The *people* in the regions where it prevailed had gained a partial knowledge of its real cause and location; but their modes of treatment were barbarous in the extreme, and by no means effective. Authors disagreed among themselves in not a few points of the most essential character, and hardly one of them even approximated to a true description of the blind staggers of the South. The name staggers had a variety of vague and perplexing applications in their accounts. Some spoke of the disease as heart staggers; others described stomach staggers, brain staggers, sleepy staggers, and mad staggers, each reasoning from *effect* rather than cause.

Several writers have advanced the opinion that the disease is caused by the horse eating the spiders' webs on the grass, in the morning, when wet with dew. Unfortunately for this theory, however, horses that are kept in the stable are found to be more subject to it than those which run in pasture. Besides this, in some parts of Mississippi, where its ravages have been as bad as in any part of the whole South, there are no such spiders' webs. Still further, it frequently rages in the winter, when there is neither grass in the pastures, nor spiders to spread their webs upon it.

Equally absurd is the theory that a disease of so dreadful a type—extending its ravages over almost one-half of our country, well-nigh equaling in extent, as also in malignity, that dreadful scourge cholera, attacking not only horses, mules, jacks, and even hogs alike, but those of all ages and conditions—is the result of over-eating, of a diseased stomach.

The various theories advanced by different authors seem to us to be but lame attempts to explain what they do not understand. The people of the affected localities, we found, had gained some knowledge of the cause of the disease, and the parts particularly affected; and this knowledge was of

essential service to the author in determining its correct pa thology. As before intimated, however, the modes of treatment then in practice were equally barbarous with those applied to big head and fistula, and scarcely more effective than they. The term "blind staggers" was suggestive, and properly applied; for it indicates two effects of the disease, and points to its true pathology.

We found that a very general opinion prevailed among the people of the affected districts that staggers was, in some way, connected with the horse's eating the corn grown upon land that had just been cleared. Its ravages were the greatest about the time of gathering such corn, and at those seasons when it was fed in the greatest quantity. These circumstances induced us to examine it, to ascertain, if possible, whether any connection really existed between the eating of such corn and the developments of the disease. We found that corn grown upon new land is very apt to be badly eaten by a species of greenish-yellow worm, which leaves upon it a dust, or excrement, of a very poisonous nature. Corn grown upon old ground is often very considerably injured from the same cause, but to a much less extent. As an evidence of the poisonous qualities of this worm-dust, if a plaster, made by mixing it with vinegar, be placed upon the back of the hand, it will raise a blister in a short time.

To us it seems perfectly clear that the stomach has nothing to do with the disease, except *sympathetically*. We shall be compelled to look to some other source for its origin. This we believe to be the effects of the worm-dust upon the corn, but operating in an entirely different way from that which the people of the South were accustomed to imagine.

There is a little orifice in the nostril of the horse, situated upon the back part of it, and about an inch from the outlet. In size it varies somewhat in different horses, but is usually about an eighth of an inch in diameter. This little opening—with several smaller ones, which may be found higher up the nose—is the outlet of the *lacrymal duct* (lacrymal meaning tears), which is the tube, or passage, that drains the

water from the eyes. All the animals of the higher types of organism have an organ answering this purpose. Nature supplies to all these a watery secretion, to wash the eye and keep it moist, and when this fluid has performed its office, it passes off through this little duct into the nose. In the horse and the mule, the lacrymal tube has its outlet into the nose situated much lower down than in any other animal, and, in the former especially, may be seen very plainly.

When the horse eats the worm-eaten corn we have described, he snuffs the excrementory dust upon it up his nose, and it sometimes lodges in these little openings. Its poisonous qualities cause them to swell and fester, from which they shortly become closed, so that the water from the eyes can not be discharged. These ducts communicate with the nasal cavities of the head, which, in like manner, become filled with the poisonous retained water. They remain not long in this condition before disease and inflammation set in; the surrounding parts are next involved; finally, the optic nerve—the nerve of the eye—becomes affected, and at once blindness and staggering begin. The brain and the whole head partake of the rapidly-spreading derangement, and presently the stomach also, with the entire line of the intestinal canal. The dreadful virus affects every vital organ, and nearly every part of the body. It is a strange and peculiar poison, equally so in its nature and effect.

That climate and a variety of unfavorable circumstances, may greatly aggravate the disease, is undoubted. We are fully satisfied, however, that blind staggers arises from an inflamed condition of the optic nerve of the eye, the inflammation being produced by the worm excrement, which finds its way into the nose, as already stated, and which differs materially from any commonly found upon the corn further north.

Numerous examinations of the optic nerve, made immediately after death from this disease, showed it to be in a dreadfully inflamed condition, and already exhibiting signs of decomposition. No traces of disease were discovered in

the coatings or humors of the eye. These were all perfect and natural, as in health; but that portion of the brain nearest to, and in immediate connection with, the nerve was much inflamed, and patches or lines of red extended in all directions from the point whence the nerve proceeded, showing that inflammation had reached this region also. Here, undoubtedly, was the final cause of death. Collections of slimy, yellow water had gathered upon this portion of the brain. Similar evidences of decomposition were apparent here. The inflammation developed by this malady is of a peculiar character. It is the effect of a poison carried directly to the brain.

Sometimes there is stoppage of the lacrymal ducts upon only one side of the head, and then the inflammation, for a time, will be confined to that side. Such a horse becomes entirely blind in the eye on the affected side, and partially so, through sympathy, on the other. In this condition he follows the imperfect sight of this eye, which is placed at a considerable angle with the direction of the body, and he continues to turn round and round. As he moves forward, the angle of direction is constantly changing inward, and he describes a circle whose diameter is about sixty feet. Around this circle he pursues his unsteady march as long as he is able to walk. It is an invariable peculiarity of this form of the disease that the poor creature is always in motion. Not only is he nearly always blind, but deaf also. There is no question as to his blindness in one eye. You may go up to him on that side, and put your hand on his head, before he appears to know it; and then he jumps and springs away, with every sign of alarm. If approached upon the other side, he continues to sheer off, just as a horse always does that is partially blind. We have seen many a circular path, traced by the sufferer from blind staggers, that was beaten almost as hard as the foot-paths of a horse-mill. If interrupted in his rounds, he changes his direction merely, strikes out a different circle, and in it moves forward as before.

Occasionally a spasm or fit comes on, when he staggers,

pitches, and reels like a drunken man. The length of time which these spasms continue varies from twenty minutes to an hour, or sometimes even two hours. Occurring, at first, no oftener perhaps than once a day, they rapidly increase in frequency and severity. As his end draws near, the horse is only out of one fit into another. The terrible sufferings of the poor creature in these paroxysms of agony are beyond description. He stamps and paws with his fore-feet, rears upon his hind legs, and, falling backwards, sometimes kills himself instantly by the dislocation of his neck. If he falls upon his side, he throws his feet rapidly about, and beats the ground with his head in the most violent manner. Now, quick as he is able, he springs to his feet, only to go through with the same wild actions again. He does not always fall to the ground, but sometimes reels and staggers about, strikes out with his feet, and thus makes it dangerous to be near him. All at once he starts off on a run, as fast as he can go. Bringing up against a tree, a fence, or the side of a house, he is knocked flat to the earth, and, if his legs or neck are not broken, he is sadly cut and bruised at least.

All this time his groanings and complainings continue distressing in the extreme. Only at intervals does he seem to be rational; then he appears to recognize his keeper, and it is really painful to hear how piteously he begs for assistance. During the subsidence of the spasm, his breathing comes thick and fast. It is not only very rapid, but constrained, so that his sides puff in and out like a pair of bellows. Finally the spasm spends its force, and passes off, and, for a time, he rests in comparative ease. If on his side, he remains lying there for a long time, as still as death. Very commonly the spasm seems to pass off instantly, and, if on his feet, he remains standing, with his head drooping, and eyes closed, as though he were asleep. After a time he rouses again, and resumes his motions in a circle.

When both sides are affected alike, (which is often the case,) the horse becomes entirely blind in both eyes, and

stands, trembling and shaking, with his head down, and his eyes closed, as if asleep. In this state he remains until a spasm comes on. *Then* he runs and pitches about in a manner more terrible, if possible, than that already described—his nostrils distended, his breath so short and thick as nearly to produce convulsions of the sides. Such is the dreadful excitement now raging, that it almost appears as if his whole body was about to be torn to pieces. When the spasm passes off, he lapses into the sleepy, torpid, trembling condition, which has been called sleepy staggers.

In this phase of the disease, the horse seems utterly indisposed to movement of any kind, except while frenzied from his fearful spasms. It is a question whether he is in possession of his proper faculties at all. When the disease manifests itself in this form, it soon runs its course, and death speedily puts an end to the poor creature's suffering.

Sometimes the horse shows signs of this disease for several days, and, in other cases, for only a few hours. But the origin of the trouble always dates back some time, perhaps even weeks previous, although it may never have been suspected until its violent symptoms were fully declared.

THE OLD MODES OF TREATMENT.

The methods of treatment formerly in vogue at the South, although tainted by extreme cruelty and shocking violence, furnish a strong argument in substantiation of the views we have put forward in regard to the causes of blind staggers. A sad, unwelcome experience had taught the people some valuable lessons concerning the disease. One of these was that its seat was in the head.

In order to make the treatment correspond with this hypothesis, it was a common practice to cut a place in the skin, about an inch long, over the region of the brain; then to insert some poisonous substance, and close the wound over again. By producing a rapidly-running sore, this course, notwithstanding the torture it occasioned, sometimes gave relief.

Another method was to drive a chisel through the frontal bone, just below the region of the brain, and let the accumulation of purulent fluid run out. This sometimes succeeded, and from two to three pints of yellow and quite offensive water were thus discharged. But, although sometimes successful, this operation was attended with great danger. The shock of bursting the skull-bone killed the horse oftener than the treatment saved him.

Boring with a gimlet was tried as a substitute for the chisel, but this, likewise, proved extremely hazardous. The wedge-like action of the gimlet commonly split the skull and killed the horse.

One great difficulty in treating the staggers was found to be the horse's extreme restlessness, amounting frequently to perfect frenzy. This was much aggravated by the harshness of these processes. It was generally impossible to operate upon the animal without throwing him to the ground. The fall, and his subsequent strugglings, sometimes killed him. Even in those stages of the disorder in which he was drooping, and perfectly still when unmolested, as soon as touched he grew perfectly excited, or even furious.

The practice of these different methods proves clearly enough that the people generally understood that the diseased water from the eyes had somehow accumulated within the head, and was the cause of the mischief, and that, if it could be drawn off in time, the horse might be saved. With this idea was connected the belief, as already stated, that the worm-eaten corn was in some way—they hardly knew how—instrumental in developing the disorder.

PREVENTIVES.

"An ounce of prevention," says the old proverb, "is worth a pound of cure." This is emphatically true in regard to the staggers.

Horses and colts that run constantly in pasture are not troubled with the disease. Let the stable-fed horse have a diet from which corn is excluded, and he will be almost

equally exempt. Of two farmers, in the same neighborhood where the disease prevails extensively, let one carefully brush off the worm-dust from the corn before feeding it to his horses, and the other neglect this precaution. The former will be in little danger of any trouble with blind staggers among his stock, while the latter stands a good chance of having to sustain heavy losses from it.

These facts plainly indicate one highly-important means of prevention. If the farmer must feed worm-eaten corn to his horses, he should be at pains first to brush off the poisonous dust. It would be still better if he could get corn altogether free from it.

Good, strong wood ashes, kept in the trough or manger, have been used with excellent results, as a preventive remedy. Still more certain and efficacious, when it is employed in the same manner, are the effects of tobacco, especially if the finer portions of it shell off in the manger. The tobacco, in fact, had better be made fine before placing it in the feeding-place. The fine dust of these substances increases the secretions, so as to keep the lacrymal ducts open.

It will be well to watch for the premonitory symptoms of the disease, such as the horse drooping his head; sudden starts, as if struck with a whip; the pulse very rapid, and hot; and great heat about the head, in the region of the brain, as well as the frontal bone, just below the eyes. More marked indications accompany the further development of the disease. When the horse is in health, a rap upon the cranium gives forth a hollow sound; but now the sound is dull and heavy, much as when a cup filled with water is struck. The little openings into the nostrils, which we have described, should show no signs of obstruction, nor of any discharge other than the clear-looking water from the eyes. But now the openings appear nearly or quite stopped up, and discharge more or less matter; the nostrils are covered with scabs, and much swollen, and the back parts of them appear very red and angry. When these symptoms are exhibited, the owner may be sure that blind staggers, in its worst stages, is at no great distance.

The nose should be examined frequently, to detect the first indications of any such evil omens.

TREATMENT.

The treatment is as simple as its philosophy is obvious. If the disease has its origin in a stoppage of the lacrymal tubes and the nasal cavities of the head, and the collection in them of that diseased, poisonous fluid which is secreted by their inflamed surfaces, it is reasonable to suppose that, to reopen those tubes, and to draw off that fluid, will give relief. Such is really the case; and if these important operations can be successfully accomplished, there need be little fear in regard to the animal's ultimate recovery. The inflammatory and other general consequences of the disease may be removed by proper treatment.

The chief difficulty is to do any thing at all. In many instances, the disease makes such rapid headway before it is discovered, that the case is hopeless from the outset. It is very difficult, too, to keep the sufferer still for a sufficient length of time to permit proper treatment. Even when this can be done, the remedy often proves ineffectual, so dreadfully inflamed and swollen have the ducts become, and so great the accumulation of the mattery fluid within them, which the prevailing fever often changes into a thick and almost solid substance.

But to describe the treatment. Bleed the horse in the neck vein as long as he can bear it. Then give a drench, as follows: A half-pound of Epsom salts in a pint of warm water, to which add a gill of moderately-strong tobacco juice. This will make the animal very sick, and one who uses it for the first time is likely to think the horse is about to die. But, although his eyes become glassy, and he reels, and sometimes falls to the ground, there is much less danger in giving such a mixture to a horse than to a human being. It will not kill him, but affords nearly the only chance for prosecuting the treatment to a perfect cure; for, as soon as it takes effect, he becomes quiet, so that you may handle your patient as you please.

Before the effects of this medicine pass off, give him two ounces of laudanum in a little warm water. Do not fail in this, if it can possibly be done. The great object now is to prevent the return of another spasm, by getting him completely under the influence of an anodyne.

Next, procure a stick, about two feet in length, and make a soft swab on the end of it. Tie the swab on securely, and let the cloth extend over the end of the stick. The string should be long enough to hang down to the other end of the stick, so that you can hold it in your hand, and then, if the cloth should happen to come off while the swab is being used, you will still have hold of it. Dip the swab into some weak tobacco-juice, quite warm, and run it up the horse's nose. Repeat this carefully a few times, and then wash out the whole nostril thoroughly with the little mop. This will open the ducts, and let the water collected in them run out. Whenever a free discharge from the nose can be effected, the horse is out of present danger, and, if the treatment is carried out, will presently get well. The foul, watery secretions will sometimes drip from the nostrils in almost a stream, for a day or more. In a few cases, the writer has known strings of tough, nearly solid matter, two or three inches in length, to be forced from the outlet of the ducts, after which the water would commence running from them freely.

The final step is to induce a speedy and powerful counteraction, to prevent inflammation from reaching the brain; or, if it already exists in that organ, to reduce it. What is done for this purpose must be done quickly. The symptoms of the disease will not wait for the slow action of ordinary remedies. A blister must be raised immediately over the region of the brain. To do this most quickly, wet the skin with the corrosive liniment, or, in the absence of this, with turpentine. Over this lay an old piece of cloth, two or three folds in thickness, and apply on the outside a hot smoothing-iron. Hold it there until a blister is drawn.

One bleeding will nearly always be sufficient; but the rest of the treatment it may be necessary to repeat a number of

times, through several days. There may be no need, perhaps, of giving the drench of tobacco-juice more than once or twice. Of the laudanum, an ounce will often be enough to produce the desired effects, after the first day.

If the horse will eat at all, feed light, and give no corn. Green grass is the best food. For several weeks, keep him perfectly quiet.

When the brain has become seriously involved, it is too late. Death will soon relieve the practitioner of all his labors, and the patient of his suffering. There is but one sure indication of the abatement of the disease, and that is, the running at the nose. In this disease, no positive assurance of saving life can be given. All efforts will often fail, and, still oftener, no remedy can be used at all. Hence, the importance of prevention by one of the methods we have described.

RECAPITULATION OF TREATMENT.

1st. Bleed as long as the horse can bear it.
2d. Give the drench of tobacco-juice, with the salts.
3d. Swab out the nostrils to open the ducts.
4th. Raise a blister over the region of the brain.

GLANDERS.

Although not usually classed as such by veterinary authors, this is really just what its name implies—a disease of the glands. The lymphatic and nasal glands in the head are the ones particularly affected; and here the disease, in its early stages, may often exist for months, or possibly for years, entirely unsuspected. From them first proceed the glanderous discharges from the nose, which *afterward* ulcerate the lining membrane of the nostril. Hence the reason of our departure from nearly all antecedents in respect to the classification of this disease.

Glanders is indeed an awful malady, dreadfully contagious, and when fully developed, nearly incurable. There are three stages of it, as will be explained presently. Only in the first,

and sometimes in the second of these, does the disease admit of a cure at all; but, unfortunately, it is most frequently overlooked, or else entirely misunderstood, until it is too late. It is only when the scourge assumes its most malignant type that the owner or keeper becomes aware of its existence; and even then he is too often unwilling to acknowledge its presence, until forced to do so by the spread of the contagion, and other signs too plain to be disregarded.

Happily, this pest of European countries—this curse of English stables—seldom occurs in our rural districts. In this country it is almost exclusively confined to cities, with their crowded stables, and large numbers of horses herded together.

In tracing the history of any considerable number of cases, infection will be found at the root of the trouble much more frequently than any other circumstance. But there are several causes which may generate the disease, where contagion has never been possible. In such cases it is invariably the offspring of filth and mismanagement. The hot-beds where it usually develops itself, and best thrives, are our cavalry corrals, and other places where large droves of horses are crowded together, close and ill-ventilated stables, and those in low and damp situations. Among the many causes of glanders, however, none are so fruitful as impure air, and unwholesome food and water—of all which the horse is likely to get the most in the places we have named. Any one of these may be sufficient, at times, to give existence to this terrible disease; yet, after all, the majority of cases are undoubtedly the result of infection communicated from one horse to another.

The opportunities for infection are always very great. In large stables, where strange horses are constantly coming and going, it is a wonder that it occurs no oftener than it does. The degree of exemption which they enjoy can only be attributed to their greatly improved construction and management. The ventilation, good order, and cleanliness which characterize the large majority of them are truly commend-

able, and no less so the caution and care manifested by their managers in regard to food and water. These, together with the attention bestowed upon washing and cleaning the horse, and removing filth from near the stall, have made this loathsome disease comparatively rare in even our city stables. During the last half century, there has been a more marked improvement in the home of the horse than even in that of man.

Yet infection may take place from circumstances against which no caution or foresight can fully guard. The traveler comes along with a fine-looking horse, entirely ignorant that any thing is wrong with him, although, in reality, he is glandered. He is put in the stable, eats from the manger, drinks from the common bucket or water-tub, and departs, leaving behind the dreadful infection, which may be imparted to every horse that eats or drinks at the same place. Possibly all do not take it, however; for such is the power of healthful Nature to resist disease, that many horses have escaped, even when exposed to this contagion, which is more readily communicated than any other known.

But why is such an animal admitted to the stable, or allowed to associate with others in any manner? One reason we have intimated; namely, ignorance on the part of his keeper concerning his real condition. In the case above supposed, he is received by some attendant, led to a stall, fed, and watered, without the most cursory examination, or a single thought of his being diseased. Even if any examination is made, it is not a little difficult for any but the most experienced to distinguish between glanders and some other affections which occasion running at the nose. Often, too, the discharge is so inconsiderable, and so much like the common water from the eye, that it runs on for months entirely unsuspected, meantime scattering its mischief in all directions.

The most scientific practitioner is sometimes puzzled in discriminating between glanders and some other affections of the head. It is of the utmost importance, however, that this be done correctly; and in this, the decision must usually be made

by the farmer himself. We shall, therefore, not only describe the disease, as it has come under our own observation, as accurately as possible, but shall not hesitate to avail ourselves of the experience of others, to the end that the reader, by having all the light which the best writers have been able to cast upon the subject, may be so fully informed as to be enabled to detect the disease in every form, and to guard against it in every possible manner.

There are three stages of glanders, as manifested in the discharge from the nostrils. In the first of these, the discharge so much resembles that which attends other nasal affections, and even the healthy secretions which moisten the eyes, that the disease is not recognized, but passes on to the second, and perhaps even the third stage, before the owner awakens to a realization of the dreadful enemy which confronts him.

Two peculiarities distinguish the first stage as glanders. The first is, that the discharges are of a more sticky character than any others; the second is, that the discharge, in nearly all cases, is confined to one nostril, and that the left. Why this is so has never been satisfactorily explained. We only know the fact. Occasionally, however, the right nostril is the one affected, but rarely both nostrils at the outset.

A thickening and increased flow characterizes the discharge in the second stage. Its consistence becomes more mucous and sticky, and its color changes from an almost transparent clearness to a whitish tinge, bordering upon yellow. In many cases it drips from the nose in long, stringy clots. The membrane of the nose shows a pallid or leaden hue, and ulcers sometimes make their appearance high up in the nostril.

The third and last stage is usually slow in its development, and, from the concurrent testimony of all reputable authorities, must be regarded as incurable. In this, the discharges are greatly thickened, its mucous consistency and stickiness proportionately increased, its color considerably darker and yellower, and frequently it is flecked with blood.

As has been already stated, glanders is a foreign rather than an American disease. Where one case occurs in the United States, there are, at least, two or three in England and France In fact, our continent has never been devastated by contagious affections, among either man or beast, to the same extent as the Old World. Opportunities for investigating this disease, and tracing out its history and various developments, have been much more abundant in Europe than in this country.

In this connection, we must acknowledge our indebtedness to Mr. Youatt's excellent treatise upon the English horse. For the benefit of the reader, we introduce the following extract from that deservedly-esteemed work, and are satisfied that, notwithstanding its great length, occasional inaccuracies, and despairing conclusions, he will fully appreciate the fidelity and research which it displays. Its descriptions give it great value:

"The earliest symptom of glanders is an increased discharge from the nostril, small in quantity, constantly flowing, of an aqueous character, and a little mucus mingling with it.

"The discharge of glanders is not sticky when it may be first recognized. It is an aqueous or mucous, but small and constant discharge, and is thus distinguished from catarrh, or nasal gleet, or any other defluxion from the nostril. It should be impressed on the mind of every horseman that this small and constant defluxion, overlooked by the groom and by the owner, and too often by the veterinary surgeon, is a most suspicious circumstance.

"If a horse is in the highest condition, yet has this small constant aqueous discharge, and especially from one nostril, no time should be lost in separating him from his companions. No harm will be done by this, although the defluxion should not ultimately betray lurking mischief of a worse character.

"The peculiar viscidity and gluiness, which is generally supposed to distinguish the discharge of glanders from all other mucous and prevalent secretions, belongs to the second stage

of the disease, and, for many months before this, glanders may have existed in an insidious and highly-contagious form. It must be acknowledged, however, that, in the majority of cases, some degree of stickiness does characterize the discharge of glanders from a very early period.

"It is a singular circumstance, for which no satisfactory account has yet been given, that when one nostril alone is attacked, it is, in a great majority of cases, the near, or left. M. Dupuy, the director of the veterinary school at Toulouse, gives a very singular account of this. He says that out of eighty cases of glanders, that came under his notice, only one was affected in the right nostril. The difference in the affected nostril does not exist to so great an extent in Great Britain; but, in two horses out of three, or three out of four, the discharge is from the left nostril.

"This discharge, in cases of infection, may continue, and in so slight a degree as to be scarcely perceptible for many months, or even two or three years, unattended by any other disease, even ulceration of the nostril, and yet the horse being decidedly glandered from the beginning, and capable of propagating the malady. In process of time, however, pus mingles with the discharge, and then another and a characteristic symptom appears. Some of this is absorbed, and the neighboring glands become affected. If there is discharge from both nostrils, the glands within the under jaw will be on both sides enlarged. If the discharge is from one nostril only, the swelled gland will be found on that side alone. Glanders, however, will frequently exist at an early stage without these swelled glands, and some other diseases, as catarrh, will produce them. Then we must look out for some peculiarity about these glands, and we shall readily find it. The swelling may be at first somewhat large and diffused, but the surrounding enlargement soon goes off, and one or two small distinct glands remain; and they are not in the center of the channel, but adhere closely to the jaw on the affected side.

"The membrane of the nose should now be examined,

and will materially guide our opinion. It will either be of a dark, purplish hue, or almost of a leaden color, or of any shade between the two; or if there is some of the redness of inflammation, it will have a purple tinge; but these will never be the faint pink blush of health, or the intense and vivid red of inflammation. Spots of ulceration will probably appear on the membrane covering the cartilage of the nose—not mere sore places, or streaks of abrasion, and quite superficial, but small ulcers, usually approaching to a circular form, deep, and with the edges abrupt and prominent. When these appearances are observed, there can be no doubt about the matter. Care should be taken, however, to ascertain that those ulcers do actually exist, for spots of mucus, adhering to the membrane, have been more than once taken for them. The finger should, if possible, be passed over the supposed ulcer, in order to determine whether it can be wiped away; and it should be recollected, as was hinted when describing the duct that conveys the tears to the nose, that the orifice of that duct, just within the nostril, and on the inner side of it, has been mistaken for a cancerous ulcer. This orifice is on the continuation of the common skin of the muzzle, which runs a little way up the nostril, while the ulcer of glanders is on the proper membrane of the nose above. The line of separation between the two is evident on the slightest inspection.

"When ulcers begin to appear on the membrane of the nose, the constitution of the horse is soon evidently affected. The patient loses flesh; his belly is tucked up; his coat is unthrifty, and readily coming off; the appetite is impaired; the strength fails; cough, more or less urgent, may be heard; the discharge from the nose will increase in quantity; it will be discolored, bloody, and offensive to the smell; the ulcers in the nose will become larger and more numerous, and, the air-passages being obstructed, a grating, choking noise will be heard at every act of breathing. There is now a peculiar tenderness about the forehead. The membrane lining the frontal sinuses is inflamed and ulcerated, and the integument

of the forehead becomes thickened, and somewhat swelled. Farcy is now superadded to glanders, or glanders has degenerated into farcy, and more of the absorbents are involved.

"At or before this time, little tumors appear about the muscles, face, and neck, following the course of the veins and the absorbents, for they run side by side, and these the tumors soon ulcerate. Tumors, or buds, still pursuing the path of the absorbents, soon appear on the inside of the thighs. They are connected together by a corded substance. This is the inflamed and enlarged lymphatic, and ulceration quickly follows the appearance of these buds. The deeper-seated absorbents are next affected; and one or both of the hind legs swell to a great size, and become stiff, hot, and tender. The loss of flesh and strength is more marked every day. The membrane of the nose becomes of a dirty, livid color. The membrane of the mouth is strangely pallid. The eye is infiltrated with a yellow fluid, and the discharge from the nose becomes more profuse, and insufferably offensive. The animal presents one mass of putrefaction, and, at last, dies exhausted.

"The enlargement of the submaxillary glands, as connected with this disease, may, perhaps, require a little further consideration. A portion of the fluid secreted by the membrane of the nose, and altered in character by the peculiar inflammation there existing, is absorbed; and, as it is conveyed along the lymphatics, in order to arrive at the place of its destination, it inflames them, and causes them to enlarge and suppurate. There is, however, a peculiarity accompanying the inflammation, which they take from the absorbtion of the virus of glanders. They are rarely large, except at first, or hot or tender; but they are characterized by a singular hardness, a proximity to the jaw-bone, and frequently actual adhesion to it. The adhesion is produced by the inflammatory action going forward in the glands, and the effusion of coagulable lymph. This hardness and adhesion accompanying discharge from the nostrils, and being on the same side with the nostril whence the discharge proceeds, afford proof

not to be controverted that the horse is glandered. Notwithstanding this, however, there are cases in which the glands are neither adherent nor much enlarged, and yet there is a constant discharge from one or both nostrils. The veterinary surgeon would have little hesitation in pronouncing them to be cases of glanders. He will trust to the adhesion of the gland, but he will not be misled by its looseness, nor even by its absence altogether.

"Glanders have been confounded with strangles, and by those who ought to have known better. Strangles are peculiar to young horses. The early stage resembles cold, with some degree of fever and sore throat—generally with distressing cough, or, at least, frequent wheezing; and when the enlargement appears beneath the jaw, it is not a single small gland, but a swelling of the whole of the substance between the jaws, growing harder toward the center, and, after awhile, appearing to contain a fluid, and breaking. In strangles the membrane of the nose will be intensely red, and the discharge from the nose profuse and purulent, or mixed with matter almost from the first. When the tumor has burst, the fever will abate, and the horse will speedily get well.

"Should the discharge from the nose continue, as it sometimes does, for a considerable time after the horse has recovered from strangles, there is no cause for fear. Simple strangles need never degenerate into glanders. Good keeping, and small doses of tonic medicines, will gradually perfect the cure.

"Glanders have been confounded with catarrh, or cold; but the distinction between them is plain enough. Fever, loss of appetite, and sore throat accompanying cold—the quidding of the food and gulping of the water are sufficient indications of the latter of these; the discharge from the nose is profuse, and, perhaps, purulent; the glands under the jaw, if swelled, are movable; there is a thickening around them, and they are tender and hot. With proper treatment, the fever abates, the cough disappears, the swellings under the throat subside, and the discharge from the nose gradually ceases;

or, if it remains, it is usually very different from that which characterizes glanders.

"In glanders there is seldom cough of any consequence, and, generally, no cough at all. A running from the nose, small in quantity, and, from the smallness of its quantity, drying about the edges of the nostrils, and presenting some appearance of stickiness, will, in a few cases, remain after catarrh, and especially after the influenza of spring; and these have gradually assumed the character of glanders, and more particularly when they have been accompanied by enlarged glanders and ulceration in the nose. Here the aid of a judicious veterinary surgeon is indispensable, and he will sometimes experience considerable difficulty in deciding the case. One circumstance will principally guide him. No disease will run on to glanders which has not, to a considerable and palpable degree, impaired and broken down the constitution, *and every disease that does this will run on to glanders.** He will look then to the general state and condition of the horse, as well as to the situation of the glands, the nature of the discharge, and the character of the ulceration.

"If, after all, he is in doubt, an experiment may be resorted to, which wears, indeed, the appearance of cruelty, and which only the safety of a valuable animal or of a whole team can justify. He will inoculate an ass, or a horse already condemned to the hounds, with the matter discharged from the nose. If the horse is glandered, the symptoms of glanders, or farcy, will appear in the inoculated animal in the course of a few days.

"The *post-mortem* examination of the horse will remove every doubt as to the character of the disease. The nostril is generally more or less blanched with spots or lines of inflammation, of considerable intensity. Ulceration is almost invariably found, and of a chancrous character, on the septum, and also on the æthmoid and turbinated bones. The ulcers evidently follow the course of the absorbents, sometimes almost

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*We regard this as certainly an over-statement.

confined to the track of the main vessel, or, if scattered over the membrane, generally thickest over the path of the lymphatic. The æthmoid and turbinated bones are often filled with pus, and sometimes eaten through and carious; but, in the majority of cases, the ulceration is confined to the external membrane, although there may be pus within. In aggravated cases, the disease extends through all the cells of the face and head.

"The path of the disease down the larynx and windpipe is easily traced, and the ulcers follow one line, that of the absorbents. In aggravated cases, this can generally be traced on to the lungs. It produces inflammation of these organs, characterized, in some cases, by congestion; but in other cases, congestion having gone on to hepatization, in which the cellular texture of the lungs is obliterated. Most frequently, when the lungs are affected at all, tubercles are found (miliary tubercles), minute granulated spots on the surface or in the substance of the lungs, and not accompanied by much inflammation. In a few cases, there are larger tubercles, which soften and burst, and terminate in cavities of varying size.

"In some cases, and showing that glanders is not essentially or necessarily a disease of the lungs, there is no morbid affection whatever in those organs.

"The history thus given of the symptoms of glanders will clearly point out its nature. It is an affection of the membrane of the nose. Some say that it is the production of tubercles, or minute tumors, in the upper cells of the nose, which may long exist undetected, except by a scarcely perceptible running from the nostril, caused by the irritation which they occasion. These tubercles gradually become more numerous; they cluster together, suppurate and break, and small ulcerations are formed. The ulcers discharge a poisonous matter, which is absorbed and taken up by the neighboring glands, and this, with greater or less rapidity, vitiates the constitution of the animal, and is capable of communicating the disease to others. Some content them-

selves with saying that is an inflammation of the membrane of the nose, which may assume an acute or chronic form, or, in a very short time, or exceedingly slowly, run on to ulceration.

"It is inflammation, whether specific or common, of the lining membrane of the nose, possibly for months, and even years, confined to that membrane, and even to a portion of it, the health and usefulness of the animal not being in the slightest degree impaired. Then, from some unknown cause, not a new but an intenser action is set up, the inflammation more speedily runs its course, and the membrane becomes ulcerated. The inflammation spreads on either side down the septum, and the ulceration at length assumes that peculiar chancrous form which characterizes inflammation of the absorbents. Even then, when the discharge becomes gluey, and sometimes after chancers have appeared, the horse is apparently well. There are hundreds of glandered horses about the country, with not a sick one among them. For months or years this disease may do no injury to the general health. The inflammation is purely local, and is only recognized by the invariable accompaniment of inflammation and increased secretion. Its neighbors fall around, but the disease affects not the animal whence it came. At length, a constitutional inflammation appears, farcy is established in its most horrible form, and death speedily closes the scene.

"What, then, is the cause of this insidious, dreadful disease? Although we may be in a manner powerless as to the removal of the remedy, yet, if we can trace its cause and manner of action, we may, at least, be able to do something in the way of prevention. Much has been accomplished in this way. Glanders does not commit one-tenth part of the ravages which it did thirty or forty years ago, and, generally speaking, it is only found as a frequent and prevalent disease where neglect, filth, and want of ventilation exist.

"Glanders may be either bred in the horse or communicated by contagion. What we have further to remark on this malady will be arranged under these two heads.

"Improper stable management we believe to be a far more frequent cause of glanders than contagion. The air which is necessary to respiration is changed and empoisoned in its passage through the lungs, and a fresh supply is necessary for the support of life. That supply may be sufficient barely to support life, but not to prevent the vitiated air from again and again passing into the lungs, and producing irritation and disease The membrane of the nose, possessed of extreme sensibility for the purposes of smell, is easily irritated by this poison, and close and ill-ventilated stables oftenest witness the ravages of glanders. Professor Coleman relates a case which proves to demonstration the rapid and fatal agency of this cause. 'In the expedition to Quiberen, the horses had not been long on board the transports, before it became necessary to shut down the hatchways for a few hours; the consequence of this was, that some of the horses were suffocated, and that all the rest were disembarked either glandered or farcied.'

"In a close stable the air is not only poisoned, by being repeatedly breathed, but there are other and more powerful sources of mischief. The dung and the urine are suffered to remain, fermenting and giving out injurious gases. In many dark and ill-managed stables, a portion of the dung may be swept away, but the urine lies for days at the bottom of the bed, the disgusting and putrifying nature of which is ill-concealed by a little fresh straw, which the lazy housekeeper scatters over the top.

"The stables of gentlemen are generally kept hot enough, and far too hot, although in many of them a more rational mode of treatment is beginning to be adopted; but they are lofty and roomy, and the horses are not too much crowded together, and a most scrupulous regard is paid to cleanliness. Glanders seldom prevail there. The stables of the farmer are ill-managed and filthy enough, and the ordure and urine sometimes remain from week to week, until the horse lies on a perfect dung-hill. Glanders seldom prevail there; for the same carelessness which permits the filth to accumu-

late, leaves many a cranny for the wind to enter and sweep away the deleterious fume from this badly roofed and unceiled place.

"The stables of the horse-dealer are hot enough, but a principle of strict cleanliness is enforced, for there must be nothing to offend the eye or nose of the customer, and there glanders are seldom found; but if the stables of many of our post horses and those employed on our canals are examined—almost too low for a tall horse to stand upright in them, too dark for the accumulation of filth to be perceived, too far from the eye of the master, ill-drained and ill-paved, and governed by a false principle of economy, which begrudges the labor of the man and the cleanliness and comfort of the animal—these will be the very hot-beds of the disease, and in many establishments it is an almost constant resident.

"Glanders may be produced by any thing that injures, or for a length of time acts upon and weakens the vital energy of this membrane. They have been known to follow a fracture of the bones of the nose. They have been the consequence of violent catarrh, and particularly the long-continued discharge from the nostrils, of which we have spoken. They have been produced by the injection of stimulating and acid substances up the nostrils. Every thing that weakens the constitution will generally lead to glanders. It is not only from bad stable management, but from the hardships which they endure, and the exhausted state of their constitution, that the post and machine horses are subject to glanders, and there is scarcely an inflammatory disease to which the horse is subject that is not occasionally wound up and terminated by the appearance of glanders.

"Among the causes of glanders is want of regular exercise. The connection, although not evident at first glance, is too certain. When a horse has been worked with peculiar severity, and has become out of spirits and falls away in flesh and refuses to eat, a little rest and a few mashes would make all right again; but the groom plies him with cordials, and

adds fuel to the fire, and aggravates the state of fever that has commenced. What is the necessary consequence of this? The weakest goes to the wall, and either the lungs, or the feet, or this membrane—that of the nose—the weakest of all, exposed day after day to the stimulating, debilitating influences that have been described, becomes the principal seat of inflammation that terminates in glanders.

"It is in this way that glanders have so frequently been known to follow a hard day's chase. The seeds of the disease may have previously existed, but its progress will be hastened by the general and febrile action excited, the absurd measures which are adopted not being calculated to subdue fever, but to increase the stimulus.

"Every exciting cause of disease exerts its chief and worst influence on this membrane. At the close of a severe campaign, the horses are more than decimated by this pest. At the termination of the Peninsular War, the ravages of this disease were dreadful. Every disease will predispose the membrane of the nose to take on the inflammation of glanders, and with many—as strangles, catarrh, bronchitis, and pneumonia—there is a continuity of membrane, an association of function, and a thousand sympathies.

"There is not a disease which may not lay the foundation for glanders. Weeks, months, and years* may intervene between the predisposing cause and actual evil; but at length the whole frame may become excited and debilitated in many a way, and then this debilitated portion of it is the first to yield to the attack. Atmospheric influence has somewhat to do with the prevalence of glanders. It is not so frequent in summer as in winter, partly attributable, perhaps, to the different state of the stable in the summer months—neither the air so close or so foul, nor the alternations of temperature so great.

"There are some remarkable cases of the connection of moisture, or moist exhalations, that deserve record. When new

* We are convinced that in this Mr. Youatt is greatly in error.

stabling was built for the troops at Hythe, and inhabited before the walls were perfectly dry, many of the horses, that had been removed from an open, dry and healthy situation, became affected with glanders, but some time having passed over, the horses in those stables were as healthy as the others, and glanders ceased to appear. An innkeeper at Wakefield, built some extensive stabling for his horses, and, inhabiting them too soon, lost a great proportion of his cattle from glanders. There are not now more healthy stables in the place. The immense range of stables under the Adelphi, in the Strand, where the light never enters, and the supply of fresh air is not too abundant, were for a long time notoriously unhealthy, and many valuable horses were destroyed by glanders; but now they are filled with the finest wagon and dray horses that the metropolis or country contains, and they are fully as healthy as in the majority of stables above ground.

"There is one more cause to be slightly mentioned—hereditary predisposition. This has not been sufficiently estimated, with regard to the question now under consideration, as well as with respect to every thing connected with the breeding of the horse. There is scarcely a disease that does not run in the stock. There is that in the structure of various parts, or their dispositions to be affected by certain influences, which perpetuates in the offspring the diseases of the sire; and thus contraction, opthalmia, roaring, are decidedly hereditary, and so is glanders. M. Dupuy relates some decisive cases. A mare, on dissection, exhibited every appearance of glanders; her filly, who resembled her in form and in her vicious propensities, died glandered at six years old. A second and a third mare, and their foals, presented the same fatal proof that glanders are hereditary.

"Glanders are highly contagious. The farmer can not be too deeply impressed with the certainty of this. Considering the degree to which this disease, even at the present day, often prevails, the legislature would be justified in in-

terfering, by some severe enactments, as it has done in the case of small-pox in the human subject.

"The early and marked symptoms of glanders is a discharge from the nostrils of a peculiar character, and if that, even before it becomes prevalent, is rubbed on a wound, or on a mucous surface, as the nostrils, it will produce a similar disease. If the division between two horses were sufficiently high to prevent all smelling and snorting at each other, and contact of every kind, and they drank not out of the same pail, a sound horse might live for years, uninfected, by the side of a glandered one. The matter of glanders has been mixed up into a ball, and given to a healthy horse, without effect. Some horses have eaten the hay left by those that were glandered, and no bad consequence has followed, while others have been speedily infected. The glanderous matter must come in contact with a wound, or fall on some membrane thin and delicate, like that of the nose, and through which it may be absorbed. It is easy, then, accustomed as horses are to be crowded together, and to recognize each other by the smell—eating out of the same manger, and drinking from the same pail—to imagine that the disease may be very readily communicated. One horse has passed the other when he has been in the act of snorting, and has become glandered. Some fillies have received the infection from the matter blown by the wind across the lane, when a glandered horse in the opposite field has claimed acquaintance by neighing or snorting. It is almost impossible for an infected horse to remain long in a stable with others without irreparable mischief.

"If some persons underrate the danger, it is because the disease may remain unrecognized in the infected horse for some months, or even years, and, therefore, when it appears, it is attributed to other causes, or to after inoculation. No glandered horse should be employed on any farm, nor be permitted to work on any road, or even to pasture on any field. Mischief may be so easily and extensively effected, that the public interest demands that every infected animal should

be summarily destroyed, or given over for experiment to a veterinary surgeon, or recognized veterinary establishment.

"There are a few instances of the spontaneous cure of chronic glanders. The discharge has existed for a considerable time. At length, it has gradually diminished, and has ceased; and this has occurred under every kind of treatment, and without any medical treatment; but, in the majority of these supposed cases, the matter was only pent up for awhile, and then, bursting from its confinement, it flowed again in double quantity; or, if glanders have not reappeared, the horse, in eighteen or twenty-four months, has become farcied or consumptive, and died. These supposed cases are few and far between, and are to be regarded with much suspicion.

"As for medicine, there is scarcely a drug to which a fair trial has not been given, and many of them have had a temporary reputation; but they have passed away, one after another, and are no longer heard of. The blue vitriol and the Spanish fly have held out longest; and, in a few cases, either Nature or these medicines have done wonders, but, in the majority of instances, they have palpably failed. The diniodide of copper has lately acquired some reputation. It has been of great service in cases of farcy, but is not to be depended on in glanders.

"Where the life of a valuable horse is at stake, and the owner adopts every precaution to prevent infection, he may subject the horse to medical treatment; but every humane man will indignantly object to the slitting of the nostrils, the scraping of the cartilage, the searing of the gland, the firing of the frontal and nasal bones, and to those injections of mustard and capsicum, corrosive sublimate and vitriol, by which the horse has been tortured and the practitioner disgraced. At the veterinary school, and by veterinary surgeons, it will be most desirable that every experiment should be tried to discover a remedy for this pest; but, in ordinary instances, he is not faithful to his own interest, or that of his neighbors, who does not remove the possibility of danger in the most summary way.

"If, however, remedial measures are resorted to, a pure atmosphere is that which should first be tried. Glanders is the peculiar disease of the stabled horse, and the preparation for, or the foundation of a cure, must consist in the perfect removal of every existing cause of the malady. The horse must breathe a cool and pure atmosphere, and he must be turned out, or placed in a situation equivalent to it.

"A salt marsh is, above all others, the situation for this experiment, but there is much caution required. No sound horse must be in the same pasture, or a neighboring one: the palings or the gates may receive a portion of the matter, which may harden upon them, and, many months afterward, be a source of mischief; nay, the virus may cling about the herbage, and empoison it. Cattle and sheep should not be trusted with a glandered horse, for the experiments are not sufficiently numerous or decided as to the exemption of these animals from the contagion of glanders.

"Supposing that glanders have made their appearance in the stables of a farmer, is there any danger after he has removed or destroyed the infected horse? Certainly there is; but not to the extent that is commonly supposed. There is no necessity for pulling down the racks and mangers, or even the stable itself, as some have done. The poison resides, not in the breath of the animal, but in the nasal discharge, and that can only reach certain parts of the stable. If the mangers, and racks, and bales, and partitions are first well scraped, and scoured with soap and water, and then thoroughly washed with a solution of the chloride of lime, (one pint of the chloride to a pailful of water,) and the walls are lime-washed, and the headgear burned, and the clothing baked or washed, and the pails newly painted, and the iron-work exposed to a red heat, all danger will cease.

"Little that is satisfactory can be said of the prevention of glanders. The first and most effectual mode of prevention will be to keep the stables cool and well ventilated, for the hot and poisoned air of low and confined stables is one of the most prevalent causes of glanders.

"Next to ventilation stands cleanliness; for the foul air from the fermenting litter, urine and dung, must not only be highly injurious to health generally, but irritate and predispose to inflammation that delicate membrane which is the primary seat of the disease. If to this be added regular exercise, and occasionally green meat during the summer, and carrots in the winter, we shall have stated all that can be done in the way of prevention.

"*Glanders in the human being.*—It can not be too often repeated that a glandered horse can rarely remain among sound ones without serious mischief ensuing; and, more than all, the man who attends on that horse is in danger. The cases are now becoming far too numerous in which the groom, or veterinary surgeon attending on a glandered horse, becomes infected, and, in the majority of cases, dies. It is, however, more manageable in the human being than in the quadruped. Some cases of recovery from farcy and glanders stand on record with regard to the human being, but they are few and far between."

While we give to his descriptions high praise for their general accuracy and clearness, we are not so despairing as this distinguished author seems to be. We do not propose to leave the unfortunate owner with the glandered horse upon his hands, and with such poor comfort as the unqualified statement that glanders is incurable. Nor can we subscribe to the sentiment "that the entire list of drugs have been tried, and have proved entirely ineffectual," or that "little that is satisfactory can be said of a preventive of glanders." The Englishman possesses the knowledge, but the Yankee goes further, and applies it. The Englishman has the science, the Yankee the invention.

In this case, as in regard to most other diseases described in this work, our remedies and treatment are exclusively our own. We believe that we have discovered a sure antidote to glanders, remarkably simple, and easily procured, unknown to the practitioners of the Old World, highly educated and scientific as they undoubtedly are. As a pre-

ventive, it is a specific. It is also a certain cure in the first stage, and, in a majority of cases, equally effective in the second. Perhaps we might even affirm that it has been known to save horses already passed into the third stage, but, knowing how difficult it generally is to draw the line of demarcation between this and the preceding stage, we hesitate to claim more than *assured* facts will warrant.

This antidote and highly valuable remedial agent is simply *tobacco*. At those periods of the disease which we have named, this hitherto useless and noxious weed possesses the wonderful power of neutralizing the virus in the blood, and of counteracting its contagious influences; to dry up the nasal discharges; and, finally, not only to abate the disease, but to remove its evil effects from the system entirely.

TREATMENT.

Bleed in the neck vein, removing about three quarts of blood. Have ready a strong decoction of tobacco, of which put one-fourth of a pint in a pint of warm water, and turn this down the horse. It will make him very sick, but it will affect him much less than when in health, and thus used, is not really dangerous. Wash out his nostrils with the tobacco decoction, weakened with water, as directed in the last section for staggers. Be at pains to reach as high up the nostril with the mop as you can. The mixture must be as hot as the horse can bear it.

Continue this treatment from two to four weeks, or until a favorable change is apparent. Use the mop in the nose for eight or ten days; drench with the tobacco mixture every third day for the time above mentioned; give the horse as much sulphur and resin as you can get him to eat for the space of ten days. A full dose will be four ounces of sulphur and two of resin, both pulverized. Let the food be light and relaxing. Grass is the preferable diet, if it is in season. If the horse is turned out to pasture, be sure that no other stock is allowed access to it. Use every precaution to prevent direct infection from the nasal discharges. Stable

the animal at night, and, in cold or wet weather, keep him where it is dry and moderately warm.

Attend promptly to disinfecting your stable. Fumigate it with tobacco-smoke while the horse is in it. Make him and all his companions inhale as much of the smoke as you can. Fill the stable with the smoke until you can no longer remain in it yourself. Wash every part of it, and especially the mangers, with a strong decoction of tobacco, and keep pounded tobacco-leaves in every feeding-place used by any horse that has been exposed to the disease. As soon as you commence this course, there is little danger of the contagion spreading further.

It may be necessary, in some cases, to continue this treatment longer than the time specified above. But if these directions are faithfully and perseveringly carried out, there are few cases of glanders which may not be successfully treated, up to the period in which the disease is passing into the third stage.

It will be an excellent precautionary measure to fumigate the stable occasionally, if there is any reason to suspect that its inmates have been exposed to this or any other infectious disease. The tobacco will prove a preventive for all alike. Other respectable authorities, besides Youatt, in the extract we have given, affirm that there is danger of infection being communicated to the attendant upon a glandered horse. This may be the case where there is no preventive. But the attendant, in a stable frequently fumigated with tobacco-smoke, and with a pipe or good cigar in his mouth, need have no fears.

We can not dismiss this subject without a few plain words to every owner of a horse.

It is a stigma upon the humanity and intelligence of any man to keep his noble and faithful servant, the horse, in a low, damp, or muddy stable, in the midst of foul air, with a great pile of manure heating and steaming beneath him; and not only without ventilation, but oftentimes deprived of light also, which is really almost as essential to the health and

comfort of either man or beast as are food and air. In the close, fetid atmosphere of such a place, neither horse nor human can long remain without succumbing to disease.

If any of these nuisances exist in your stable, in the name of every consideration of mercy, gratitude, and self-interest, give your faithful friend a better home. Let him have a clean, dry house to live in, with plenty of air and light. If the old stable can not be remedied in all these respects, tear it down, and build a new and better one. Depend upon it, you will consult your own interests by so doing; and thus, too, you may prove that you are fit to own a horse.

Of course, these suggestions must be acted upon in treating all established cases of glanders, or it is mere presumption to expect a cure. To use any remedies under the most unfavorable circumstances possible, and then, because they fail, to sweepingly condemn the whole treatment, is neither justice nor common sense.

A REMARKABLE CASE.

Having occasion to pass through Giles County, Tennessee, some time during the year 1856, the author happened to stop at the store, which was also the post-office, of the little village of Bethel. Here he heard a gentleman present remark to his neighbor that he was almost ruined; it seemed as though his horses and mules would all die, as he understood that the disease which had got among them was absolutely incurable. Inquiry elicited the following facts. The gentleman was a farmer and large stock-raiser in the vicinity, having at that time about forty head of horses and mules, most of them young, which he had been getting ready for market. He had had the great misfortune to become the owner of a glandered horse. The infection had spread among the young colts, and a number of them were already diseased.

This was, indeed, a most alarming state of affairs, involving a pecuniary interest of several thousands of dollars. It was a case, if one ever occurred, in which to test the efficacy of

our remedy for glanders. The opportunity was improved. The writer gave the gentleman the whole plan of treatment, and received from him the promise that it should be faithfully carried out. With this, he parted from Esquire Joseph Edmonston, and went on his way.

About a year later, business called us into that neighborhood again. Learning from the citizens the remarkable success which had followed the prescribed treatment, the author was drawn, by interest and sympathy, to the residence of Esquire Edmonston, and there learned from his own lips the truth of the statements already made. He informed us that, when he had used the remedy twice, the infection ceased. He had cured ten cases, and prevented the remainder of his stock from taking the disease. His stables had not been given over to the flames, not one of his horses had been killed, and he believed that the treatment, if pursued with energy, and accompanied with due attention to the surroundings and general condition of the patient, would effect a cure in the large majority of cases. By an outlay of not more than twenty-five dollars, he had saved stock valued at nearly five thousand.

FARCY.

Like its accompaniment, glanders, this disease is much more common on the old continent than it is on ours. Comparatively few American farmers have ever seen the farcy of the English and French stables. Opportunities to observe it, therefore, have not been very frequent in the United States, and our veterinarians are less familiar with it than their coadjutors across the ocean. Yet it is not an entire stranger in this country. Occasionally it makes its appearance in certain localities, and is generally, if not always, the closing chapter in the history of a case of glanders.

In our opinion, farcy is to be regarded as a general glandered condition of the horse. The poisonous virus of glanders is diffused by the blood through his entire system, and finally breaks out upon the surface of the skin in putrid ulcers,

which presently burst, and discharge a yellow, watery fluid. After this discharge has been going on for some time, it undergoes a material change. The exudations become more mattery, purulent, and offensive, and are mixed with blood. These ulcerous pustules most frequently break out upon the legs, neck, and shoulders, which are often almost entirely covered with them. At first, they are sometimes confined to the legs, and, occasionally, to but one of them. They swell, and give forth offensive discharges; the disease spreads, until the whole body often becomes a putrid and loathsome mass; and, finally, the sufferer dies.

Farcy is extremely contagious in all its stages, as its connection with glanders would lead us to expect. It is usually one of the fearful fruits of criminal neglect or mismanagement, by which the horse is allowed to rot down in damp, moldy stables, or amid accumulations of filth and dirt. The generation of this disease, more, perhaps, than that of glanders, speaks volumes in dispraise of some one.

We quote Youatt's account of farcy, which, although not precisely in harmony with every detail of our own observations, seems to us to be correct, in the main:

"Farcy is intimately connected with glanders. They will run into each other, or their symptoms will mingle together, and before either arrives at its fatal termination, its associate will almost invariably appear. An animal inoculated with the matter of farcy will often be afflicted with glanders, while the matter of glanders will frequently produce farcy. They are different types, or stages, of the same disease. There is, however, a very material difference in their symptoms and progress, and this most important one of all, that while glanders are generally incurable, farcy, in its early stage and mild form, may be successfully treated.

"While the capillary vessels of the arteries are every-where employed in building up the frame, the absorbents are no less diligently at work in selecting and carrying away every useless or worn-out portion or part of it. There is no surface, there is no assignable spot on which thousands of these little

mouths do not open. In the discharge of their duty, they not only remove that which has become useless, and often that which is healthy, but that which is poisonous and destructive. They open upon the surface of every glanderous chancer. They absorb a portion of the virus, which is secreted by the ulcer, and, as it passes along these little tubes, they suffer from its acrimonious quality; hence the corded veins, as they are called by the farrier, or, more properly, the thickened and inflamed absorbents following the course of the veins.

"At certain distances in the course of the absorbents are loose duplicatures of the lining membrane, which are pressed against the side of the vessel, and permit the fluid to pass in a direction toward the chest, but belly out and impede, or arrest, its progress from the chest. The veins at these places, and the additional inflammation there excited, is, to a greater or less degree, evident to the eye and to the feeling. They are usually first observed about the lips, the nose, the neck, and the thighs. They are very hard,—even of scirrhous hardness, more or less tender, and with perceptible heat about them.

"The poisonous matter being thus confined and pressing on the parts, suppuration and ulceration ensue. The ulcers have the same character as the glanderous ones on the membrane of the nose. They are rounded, with an elevated edge and a pale surface. They are true chancers, and discharge a virus as infectious and dangerous as the matter of glanders. While they remain in their hard prominent state, they are called buttons or farcy-buds, and they are connected together by the inflamed and corded veins.

"In some cases the horse will droop for many a day before the appearance of the corded veins or buds. His appetite will be impaired; his coat will stare; he will lose flesh. The poison is evidently at work, but has not gained sufficient power to cause the absorbents to enlarge. In a few cases these buds do not ulcerate, but become hard and difficult to disperse. The progress of the disease is then suspended,

and possibly, for some months, the horse will appear to be restored to health; but he bears the seed of the malady about him, and in due time the farcy assumes its virulent form, and hurries him off. These buds have sometimes been confounded with the little tumors, or lumps, termed *surfeit*. They are generally higher than these tumors, and not so broad. They have a more knotty character, and are principally found on the inside of the limb, instead of the outside.

"Few things are more unlike or more perplexing than the different forms which farcy assumes at times. One of the legs, and particularly one of the hinder legs, will suddenly swell to an enormous size. At night the horse will appear to be perfectly well, and in the morning one leg will be three times the size of the other, with considerable fever, and scarcely the power of moving the limb.

"At other times the head will be subject to this enlargement; the muzzle, particularly, will swell, and an offensive discharge will proceed from the nose. Sometimes the horse will gradually lose flesh and strength; he will be hide-bound; many eruptions will appear in different parts; the legs will swell; cracks will be seen at the heels, and an inexperienced person may conceive it to be a mere want of condition, combined with grease.

"By degrees the affection becomes general. The virus has reached the termination of the absorbents, and mingles with the general circulating fluid, and is conveyed with the blood to every part of the frame. There are no longer any valves to impede its progress, and, consequently, no knots or buds; but the myriads of capillary absorbents that penetrate every part become inflamed, thickened, and enlarged, and cease to discharge their function. Hence arises enlargement of the substance of various parts—swelling of the legs, chest, and head—sudden, painful, enormous, and distinguished by a heat and tenderness which do not accompany other enlargements.

"It is a question somewhat difficult to answer, whether farcy can exist without previous glanders. Probably it can

not. There is the long-continued, insidious progress of glanders—the time which may elapse, and often does, before the owner is aware, or the veterinary surgeon sure of it—the possibility that minute ulceration may have, for a long while, existed in some of the recesses of the nose, or that the slight discharge, undreaded and unrecognized, yet vitiated, poisoned, and capable of communicating the disease, may have been long traveling through the frame, affecting the absorbents, and preparing for the sudden display of farcy.

"One thing, however, is undeniable, that farcy does not long and extensively prevail without being accompanied by glanders; that even in the mild stages of farcy, glanders may be seen, if looked for, and that it never destroys the animal without plainly associating itself with glanders. They are, in fact, stages of the same disease.

"Glanders is inflammation of the membrane of the nose, producing an altered and poisonous secretion, and when sufficient of this vitiated secretion has been taken up to produce inflammation and ulceration of the absorbents, farcy is established. Its progress is occasionally very capricious, continuing, in a few cases, for months and years, the vigor of the horse remaining unimpaired; and, at other times, running on to its fatal termination, with a rapidity perfectly astonishing.

"Farcy has been confounded with other diseases; but he must be careless or ignorant who mistook sprain for it. The inflammation is too circumscribed and too plainly connected with the joint or the tendon.

"It may be readily distinguished from grease or swelled legs. In grease there is usually some crack or scurfiness, a peculiar tenseness and redness and glossiness of the skin, some ichorous discharge, and a singular spasmodic catching up of the leg. In farcy the engorgement is even more sudden than that of grease. The horse is well to-day, and to-morrow he is gorged from the fetlock to the haunch, and although there is not the same redness or glossiness, there

is great tenderness, a burning heat in the limb and much general fever. It is simultaneous inflammation of all the absorbents of the limb.

"Surfeit can scarcely be confounded with farcy or glanders. It is a pustular eruption—*surfeit bumps*, as they are called—and terminating in desquamation, not in ulceration, although numerous, yet irregularly placed and never following the course of the absorbents, but scattered over the skin.

"Local dropsy of the cellular membrane, and particularly that enlargement beneath the thorax, which has the strange appellation of water-farcy, have none of the characters of real farcy. It is general debility, to a greater or less degree, and not inflammation of the absorbents. If properly treated, it soon disappears, except that occasionally, at the close of some serious disease, it indicates a breaking up of the constitution.

"Farcy, like glanders, springs from infection and from bad stable management. It is produced by all the causes which give rise to glanders, with this difference, that it is more frequently generated, and sometimes strangely prevalent in particular districts. It will attack, at the same time, several horses in the same ill-conducted stable, and others in the neighborhood, who have been exposed to the same predisposing causes. Some have denied that it is a contagious disease. They must have had little experience. It is true that the matter of farcy must come in contact with a wound or sore, in order to communicate the disease; but, accustomed as horses are to nibble and play with each other, and sore as the corners of the mouth are frequently rendered by the bit, it is easy to imagine that this may be easily effected; and experience tells us that a horse having farcy ulcers can not be suffered to remain with others without extreme risk."

There is another eruptive disorder to which the horse is subject, that, in this country, is often called farcy, but which, in reality, is nothing more than the effect of over-heating, at a time when the blood is out of order. After a day of

severe exercise, little knots appear on the neck, shoulders, and side, with a little scabby excresence on the top of each. They last but a few days, and then go away of themselves. No danger whatever attends them, and they merely evidence some degree of impurity of the blood, which proper physicking will readily correct. This is really only a species of quick surfeit; yet the masses, in many parts of this country, attach no other meaning to the term farcy than this feeble and entirely erroneous application.

TREATMENT.

As farcy is simply a constitutional development of glanders, or, at least, a disease of precisely the same type, its treatment must be the same as that prescribed in the last section for glanders. Perhaps the principal reason why its treatment in England has been attended with better success than that of the other malady is, that remedial agents have been more directly and extensively applied in the one case than in the other. But the tobacco treatment, especially as concerns the swabbing out the nostrils, brings the remedy in equally close contact with the parts affected, in both cases.

Our experience does not confirm Youatt's statement, that farcy is more readily cured than its precursor and companion, glanders.

For the treatment of the little eruptions known as farcy by many American farmers, see section on Surfeit, in Chapter VIII.

DISTEMPER.

Many of the symptoms of this disease seem to identify it with the "strangles" of the old farriers, a name which, undoubtedly, took its rise from the circumstance that the horse is liable to be choked while eating, from his frequent attacks of coughing. English writers describe "strangles" under its old name to this day; but in this country the term is almost

unknown, and farmers and horsemen generally speak of the much too familiar "distemper," only.

Yet there are some features characteristic of distemper which do not correspond with the description of strangles, as we find it given by foreign writers. Youatt says that the latter disease is "principally incident to young horses, usually appearing between the fourth and fifth year." Distemper, however, is found to attack animals of all ages and conditions, though it is quite true that the young are the ones most subject to it. But the chief point of dissimilarity appears in this, that while no author makes any mention of strangles being a contagious disease, distemper partakes of that character in the highest degree.

There are three distinct stages of this disease. The first is marked by a dry, hacking cough, attended by a running at the nose. The discharge, at first thin and watery, soon becomes thick and purulent, and is always of a whitish color. This color, and also the cough, will be indications to which the keeper will give the utmost heed, as showing that the disease is not glanders. But if these symptoms are not sufficiently clear, others will soon follow which can not be mistaken.

The second stage comes on rapidly. The horse begins to swell under the throat, and examination reveals that it is the tonsils and salivary glands which are affected. They have been inflamed from the beginning; the glands are now closed, and matter is forming in them. Nature is striving diligently to throw off the disease in this way. An abscess next establishes itself in the throat, and in this are collected all the mattery secretions of the glands.

The abscess continues to enlarge until presently it breaks, and the matter is discharged. This constitutes the third stage. Matter may run for weeks, or perhaps months, but from this time the horse generally begins to amend.

During the whole progress of the disease there is high fever, and the pulse is excited and hard. The appetite fails, and the horse gradually loses flesh, until, at last, he is re-

duced to a mere skeleton. As the disease advances, all these symptoms are aggravated. The fever increases, the pulse grows harder and more rapid, the eyes look dull and glassy, the hair stands out, and has a dry, dead appearance, and the head droops nearly all the time. The horse either refuses to eat, or does so with great difficulty; he becomes exceedingly stupid, and seems utterly woe-begone; his whole condition is wretched indeed. If an abscess does not form, he is almost sure to die; and even when one is developed, it is often of so fearful a character as itself to be the cause of death. Occasionally, dreadful abscesses have been known to gather on the belly, near the sheath, from the effects of distemper.

We have already said that this disease is very contagious. Horses will take it from each other at considerable distances apart. In glanders, infection proceeds from the nasal discharges; but in distemper it is communicated by the feverish breath, and much further than in the case of the former. When distemper breaks out among a body of horses or mules, all are likely to have it, except those who have passed through it before; for, like small-pox in the human being, it never attacks a horse the second time. Colts and young animals, who are especially subject to it, will take it from older ones, but seldom communicate it to them. Yet it will be folly to calculate upon any exemptions when it breaks out in a stable none of whose inmates have ever had it.

Like glanders and farcy, distemper is most frequently generated by filth and bad keeping. It is undoubtedly epidemic in character, however; but, like cholera, it is always most at home in those localities where filth and miasma are most abundant. Cleanliness may be set down as essential to a cure.

TREATMENT.

The treatment, in its general features, resembles that for glanders. Bleed in the neck vein, taking about three pints

of blood; then take and thoroughly mix together one table spoonful of gunpowder, one of lard, one of soft-soap, two of tar, and one of pulverized gum myrrh; put a spoonful of this down the horse's throat, as far as you can, with a paddle or spoon. Do this twice a day. The object is not so much to have him swallow it, as it is to have it lodge about the glands of the throat. It will have the effect to stimulate their natural discharge into the mouth, and then will keep them open. At the same time, make a strong decoction of tobacco, as hot as the horse can bear it, with which wash his neck and throat. Repeat this two or three times a a day. If an abscess is actually gathering, but is not too far advanced, this treatment will be likely to drive it away. If the disease is in its early stage, the patient will get well in a few days.

In connection with the above, give the horse as much sulphur and resin as he can be induced to eat—a quarter of a pound, at least, each day. The proportions will be two parts of sulphur to one part of resin. The food should be light, such as mashes, boiled oats, and cut feed; or, if it is in season, grass will be still better. Do not give any corn until after complete recovery. On no account should the horse be worked while in this suffering condition.

Fumigate your stable well, and use the tobacco in other ways, as directed under the head of glanders. It is a disinfectant of distemper, and, if properly used, will prevent the rest of your stock from taking the disease.

The author has treated hundreds of cases of distemper, and with perfect success, almost without exception. In three cases out of five, the disease was entirely broken before the formation of an abscess. One case may be given, by way of illustration:

Dr. H. Hardison, of Marshall County, Tennessee, had lost ten young mules and colts with distemper, and still had more than thirty in a very bad way from the same cause. By the use of the treatment here laid down, these were all cured. He informed the writer that he considered himself indebted

to this course for the value of, at least, thirty young mules.

RECAPITULATION OF TREATMENT.

1st. Bleed freely in the neck vein.

2d. Give the distemper mixture according to prescription.

3d. Wash the neck and throat with the hot decoction of tobacco.

4th. Fumigate, and use the other means for disinfecting by tobacco.

NASAL GLEET.

Accompanying distemper, there is always a thick and more or less purulent discharge from the nose, continuing, very often, after all the other symptoms have abated. It is sometimes kept up for a long time, and becomes disagreeable in the extreme. The thick mattery exudations from the nose are blown out, in great flakes and plugs, many times a day, to the great annoyance of all that go near. Such a horse is a downright nuisance. He is constantly snorting to free his nose of the offensive matter, and, when least suspecting it, one may suddenly find himself perfectly bespattered with it. In his stall, every thing about him is bedaubed—the bridle, the halter, the manger—none of which can be touched without danger of having the hands covered with the filth.

This disease has received the name of gleet. It is really a species of chronic distemper, without the fever characterizing its acute forms. Sometimes it becomes a most formidable disease. The discharge is often mixed with blood, and is apt to partake of the color of the food—green, if the horse is feeding on grass; yellow, if on corn; white, if on cut feed or oats. This is doubtless caused by the relaxing and enlargement of the ducts which form the communication between the mouth and nasal cavities from the effects of disease, so that the juices of the food, during mastication, readily pass into the nostrils. Such a condition of these ducts is by no means uncommon. Every one has seen it

shown in some horses, by the water running through the nose when he drinks with the head very low.

The horse's chances for recovery, and his whole future history, will now depend entirely upon the condition he is in, and the care that is taken of him. Let him remain in a low, damp stable, half lighted, and scarcely ventilated at all, and his present condition will rapidly degenerate into glanders. As it is, the case is sufficiently obstinate to require time and not a little patience to remove it. But with fidelity and perseverance in the treatment, a cure may be effected in nearly every instance.

TREATMENT.

This, of course, will be very similar to that for distemper. Wash out the nose well with the little mop and the tobacco mixture, every day, for two weeks, or until the discharge has ceased. Bathe his throat with some of the mixture, as hot as it can be made without scalding the skin. This is to be applied every day with a large cloth. If his condition seems to indicate the desirability of a second bleeding, take not to exceed three pints more of blood. Give one pound of sulphur and half a pound of resin, in four doses—one dose each day. Should there be any cough remaining, try the distemper mixture, and continue using it as long as it seems necessary.

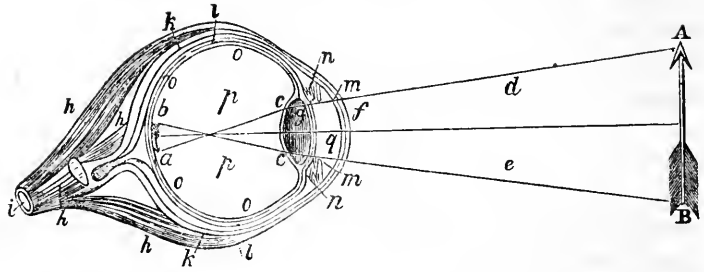
There is still some danger of infection. In addition to keeping dry tobacco-leaves in the manger of the diseased horse, the stable should be fumigated once a week for a month.

The feed must be light and moist. Good pasture, open air, and mild exercise will greatly accelerate recovery. Do not keep the horse in-doors, if the weather will permit of his being out. If in winter, let him have a liberal proportion of green feed, such as carrots, potatoes, turnips, or cabbage. At the same time, exercise him moderately each day.

For all the diseases described in this chapter, the remedy mentioned under Section VII, in Chapter XXIV, will be found highly valuable as a purifier of the blood.

CHAPTER VI.

DISEASES OF THE EYE.



THE above is a sectional view of the eye, exhibiting its different parts. It also shows in what manner the sensation of sight is produced.

A B a supposed object viewed by the animal, and an inverted image of which, *a*, *b*, is thrown on the retina at the back of the eye.

c c The points where the rays, having passed the cornea and lens, converge by the refractive power of the lens.

d e The rays proceeding from the extremities of the object to the eye.

f The *cornea*, or horny and transparent part of the eye, covered by the *conjunctiva*, uniting different parts together.

g The crystalline (crystal or glassy) lens, behind the pupil, and in front of the vitreous humor.

h h Muscles of the eye.

i The optic nerve, or nerve of sight.

k The *sclerotiva* (hard, firm coat) covering the whole of the eye, except the portion occupied by the cornea, and being a seeming prolongation of the covering of the optic nerve.

l The *choroides* (receptacle, or covering), or choroid coat, covered with a black secretion, or paint.

m m The *iris*, or rainbow-colored circular membrane under the cornea, in front of the eye, and on which the color of the eye depends. The duplicature behind is the *uvea*, so called from being colored like a grape. The opening in the center is the pupil.

n n The *ciliary* (hair-like) *processes*, which are folds, or plaits, of the choroid coat, reflected from the side of the eye to the edge of the crystalline lens.

o The *retina*, or net-like expansion of the optic nerve, spread over the whole of the choroides as far as the lens.

p The vitreous (glass-like) humor filling the whole of the cavity of the eye behind the lens.

q The aqueous (water-like) humor filling the space between the cornea and the lens.

We shall be better able to understand the various diseases of the horse's eye, if we can first get a correct idea of its structure and the functions of its different parts. With the help of the foregoing cut, this will not be difficult.

The eye has three distinct membranes, or coats, and also three humors. The *sclerotic coat* (see *k*) is that upon the outside, covering about four-fifths of the globe of the eye. It is strong, firm, and inelastic, by which qualities it is admirably adapted to its office of protecting from external injury the delicate organ which it incloses. It is of a white color, and constitutes that membrane which is seen when the "white of the eye" is exposed. In the human being, this is very conspicuous; but in the horse it is rarely visible, unless the animal meditates mischief, when he turns his glance outward or backward as far as he can, and thus shows a little patch of the sclerotic coat.

In front—this being the part over which the sclerotica is not extended—is the *cornea* (see *f*). This is a perfectly transparent coat, set in like a watch-crystal in its case, under the circular edges of the sclerotica. It is the outer membrane upon the front of the eye.

The *choroid coat*, (see *l*) comes next, nearly similar in its extension to the sclerotic. It is an exceedingly fine membrane, filled with a net-work of blood-vessels, and covered upon the inside with a peculiar secretion, a black pigment, or paint, which absorbs such wandering rays of light received within the eye as might dazzle or confuse the vision. Opposite the pupil (which will be described shortly), it has a beautiful, greenish-white lining, whose reflection, although not visible in the glare of day, may be seen quite plainly in the gray of twilight.

The inner coat of all is the *retina* (see *o*), the beautiful expansion of the optic nerve spread over the internal surface of the eye. This receives the impressions conveyed by the rays of light, which, when they fall upon it, trace on its delicate and susceptible expansion a wonderfully minute yet perfect image of the object in view from whence the rays have proceeded. By the optic nerve the sensation thus experienced is instantly communicated to the brain, the seat of intelligence, and in this way the animal is conscious of seeing.

The three humors of the eye are the *aqueous* and *vitreous*, and the *crystalline lens*, which comes between them. Anatomists do not always call the lens a humor, but such it really is.

The *aqueous* (watery) *humor* (see *q*) occupies the space between the cornea and crystalline lens. It is a perfectly transparent and limpid fluid, secreted by the lining of the chamber in which it lies. If the attenuated walls of this chamber are punctured, so that the humor escapes, Nature rapidly renews it, and the sight is restored.

The *crystalline lens* (see *g*) consists of a number of concentric layers, arranged like the coats of an onion. It has a jelly-like consistence, and in shape is double-convex, as represented in the cut. It is the chief agent in so modifying and refracting the rays of light, which are continually proceeding from every object within the range of vision, as to cause those rays to clearly trace the miniature image of that object upon the retina. Without this lens sight would be impossible.

The *vitreous* (glass-like) *humor* (see *p p*) fills the great bulk of the globe of the eye. It is a limpid fluid, but, being bound up in a net-work of transparent cells, it has the appearance and consistency of a thin jelly.

In addition to these three membranes and three humors, there are three other important things to be mentioned in our description of the horse's eye. The first of these is the *conjunctiva*, which is the very delicate membrane covering the

whole front part of the eye and the inside of the eyelids. It is perfectly transparent when in health, but becomes bloodshot or filmy when diseased. We shall see, as we proceed with this chapter, that it is extremely liable to become inflamed.

Another noticeable part which remains to be described is the *iris*, (literally, the rainbow,) so called from the beautifully intermingling hues which it displays. The cut, being a sectional view, does not show the iris any further than to imperfectly indicate its location at *m m*. It is a most elegant and delicate curtain, outstretched in the space between the cornea and crystalline lens. Its office is to moderate the light entering the eye, according to the intensity of the rays. This is the membrane that gives color to the eye, so variable in different animals and in the human species. In the horse its color is generally brown, or verging upon it.

But this curtain is not a continuous one: if it were, the inner chamber of the eye would be in a state of almost entire darkness. There is an aperture in the center, forming the *pupil*, which is the last thing we now have to describe in connection with the eye. The substance of the iris is composed of contractile tissue. When the glare of a noon-day sun, or other bright light, falls on the retina, the iris contracts, and the pupil is made smaller; but when the light which falls upon the retina is feeble—as it is at twilight, for instance—the iris relaxes and the pupil is enlarged, in order that all the rays possible may be admitted. The difference in the size of the pupil may be plainly seen by examining the eye of a sound horse, first in the stable, and then in the bright sunlight. One's own eyes (if a looking-glass be used), or those of a friend, will show similar changes, in this respect, when exposed to different intensities of light.

CAUSES OF DISEASED EYES.

The eyes of the horse are very subject to disease; for their affections, although few in number, are lamentably prevalent. Large numbers of horses are ruined yearly, to the value of

hundreds of thousands of dollars, in our country alone, by the loss of eye-sight. It is generally considered, when the eyes become diseased, that all is over with that horse—he must go blind. For most ordinary uses, such an animal is regarded as but little better than worthless. It will be quite worth our while, therefore, to examine into the causes which make so many horses go blind.

Bad stable-management and ill-usage are at the bottom of the trouble, in a large majority of instances. Of the former cause, as it exists in many portions of the Union, we can not forbear speaking with great severity; the latter is still more apparent. Both are prolific in breeding disease and contagion, and both work fearful consequences to the eye-sight.

How many stables have we visited where the volatile gas of ammonia, or hartshorn, was so strong that it brought the water into our eyes when we remained there only a few moments! What must be the effect upon the eyes of the poor horse, compelled to live amid these fumes for weeks and months together! But perhaps a still more serious evil is the deficiency of light, which characterizes so many stables. Light is essential to the health of both body and mind of man, and the physical needs of the animal, in this respect, are equally as great as his. Even vegetation, when grown in the dark, turns pale and sallow, and tastes utterly insipid. Light imparts to it essential qualities which nothing else can; and so with the physical system of living beings. The watery humors and secretions of the body are subject to change in the dark. It is not strange, therefore, that the eye suffers when deprived of the light, which is its natural element; or that, after a time, its watery humors begin to look milky.

Chronic distemper and founder, with some other constitutional diseases, which are also the offspring of bad management, help to aggravate any unfavorable condition of the eyes, and often directly predispose them to disease. External injuries operate in a similar manner. Some brutal teamster inflicts a blow on the head, which is received, in

part, by the eye-ball, or the end of his lash accidentally strikes the eye, and, in either case, soreness and inflammation follow. Few horses would ever have diseased eyes if kept in the open air and kindly cared for; nor would they be much more likely to, if they were housed in well-kept and properly-lighted stables.

Any of the circumstances which we have thus enumerated, especially when accompanied by a feverish condition of the general system, are very apt to bring on more or less inflammation about the eyes and head, frequently extending to the lacrymal ducts, which have been described in the section on blind staggers. These are closed up, so that no water can pass through them. Thus they constantly increase the inflammation of the surrounding parts, and the eye becomes worse and worse.

NATURALLY WEAK EYES.

Every farmer has heard, and probably talked, a great deal about naturally weak eyes in different horses; and yet it may be questioned whether the phrase is properly applicable once in a hundred times when people use it. *Natural* weakness or deficiency of the organ of sight, is extremely rare. It must be confessed, however, that there does seem to be a greater susceptibility of disease in some cases than in others. When the water from the eyes runs down upon the outside, it is an evidence that the lacrymal ducts, its natural channel, are closed. It indicates an inflammatory condition of those passages, which is very likely to be communicated to the eyes.

So far as our observation has extended, weak or inflamed eyes have no connection with any particular stock of horses, nor with any particular size, color, or shape of the eye, nor yet with any color of the hair. Nor do "blind teeth" trouble the horse much. If they are in the way, it is easy to knock them out with a mallet and a hard piece of wood. But this is seldom, if ever, necessary. Let them alone, and they will come away of themselves, at the proper time. There is no

such connection between these teeth and the eyes as to warrant the assumption of some modern horse doctors, that the former are the cause of serious irritation to the horse in respect to his eye-sight.

Sometimes, however, a false tooth is found growing up beside the upper jaw teeth—in part between the first and second teeth, but lapping over both of them—which it would be difficult to convince most Kentucky and Tennessee horse-breeders is not in some manner concerned in producing weak or diseased eyes. While their opinion is entirely erroneous, it is true that this tooth is so much in the way that it ought to be removed. This may be effected by the means just named, or with a large pair of forceps, a pair of pincers, or a pair of blacksmith's tongs.

There is a time in the life of the colt, during teething, when the soreness of the gums, from cutting teeth, may act as an exciting cause of fever in the head, and may thus have something to do with the eyes; but many other complaints to which the horse is subject are still more likely to produce the same effects. Big head, poll evil, glanders, distemper, and other disorders, are all accompanied by fever about the head; yet, fatal as they often prove, it is rarely that any one charges upon them the horse's weak or diseased eyes.

All these theories which assume to find the cause of blindness or imperfect vision in certain conditions of the teeth, must be regarded as thoroughly exploded. They do not stand the test of close observation, while reason is most decidedly opposed to them. The horse with the best eyes may lose them by disease; and many an animal with a suspicious looking eye, we have known to fall asleep in death, at a good old age, and both whose "naturally weak eyes" did their duty perfectly to the very last. Our experience has taught us this: Whenever you find a horse with what is called naturally weak eyes, you may set it down as an almost positive certainty that some unfeeling person has owned or used him, at some period or other, and has maltreated or abused him

in some way. Such is the history of the infirmity in nearly all cases.

Nor do we believe one half of what is said and written in regard to weak eyes being inherited. Our own observation tends to the conclusion that the doctrine of hereditary weakness, in this respect most noticeably, has been carried to an unreasonable extreme by the majority of breeders and veterinary authors. In this opinion a large number of the principal horse-raisers, with whom our profession has brought us in contact, fully coincide. Some of them have tested the question by repeated experiments. A friend in Wilson County, Tennessee, did this in the case of four blind mares, each of whom brought two or three colts in as many years, and no fault could be found with the eyes of any of them. We knew them long enough to test the matter. Except in respect to their eye-sight, they were fine mares, with good parts, and in excellent condition. The colts were equally good, and had perfect eyes besides.

If there be no other fault—if the form, size, and blood be right, there is little reason to apprehend any serious defect in the colt. Eyes and all, he will be sound hardly less surely than if neither parent had had a blemish. This is not so unreasonable as, at first sight, it may seem to many; because, as we have before said, "naturally weak eyes" and blindness are nearly always the direct result of external injury or abuse of some kind. Not long since, we saw a very fine stable horse, with an enlarged hock joint, which made him so lame that he could only with difficulty walk off at all. The owner was warranting him that this should not affect the foal, and he was perfectly safe in so doing.

Spavin, ring-bone, and some other deformities, are in the same category. They are nearly always produced by some violence or bad treatment, and are seldom transmitted from one generation to the next.

Another prevalent opinion which claims our attention is this, that young horses and colts have weak eyes oftener than more mature animals. This is certainly an entire misappre-

hension of the facts in the case. True, there is a large majority of young animals among the whole number thus afflicted; but this is only a natural consequence of the fact that there are nearly twice as many colts and young horses, in all farming regions, as there are older ones. Taking into consideration this disparity in point of numbers, no difference can be found among these classes in respect to diseased eyes.

One fact is important in this connection. Colts, like children, are more apt to take disease than they will be when they have grown older and stronger. Many a lingering and ultimately fatal disorder, in both man and beast, might have been averted by proper care and judicious management in their youth. The seeds of weakness and decay are often implanted at a very early age, growing with the growth and strengthening with the strength.

The principles laid down in this section have a pointed illustration in the history of a noble horse which the author once owned. Under the saddle and in the buggy, Turk—for that was his name—had no superior. He was a deep chestnut sorrel, a perfect beauty. We owned him three years, and at the end of that time his eyes went entirely out. They were fearfully diseased when he came into our hands, and had been for at least two years previous. During all this time, his eye-sight was gradually but surely fading away. The right eye failed first, and then the left. Such was the power and endurance of his vital energies, that for this long period of time they resisted the encroachments of disease, and succumbed at last, only after a struggle of five years.

Turk had every indication of good eyes. They were large and well set in the sockets, with a wide space between them, and the bone of the skull was dishing. In short, his head was a perfect model for a strong eye. Now, what was the cause of his going blind? His case was called one of "naturally weak eyes." We traded for him, in part, to experiment upon, and to see whether his eyes could not be cured; and

although they had gone too far for this, we are satisfied that partial sight was prolonged at least two years by the treatment applied to them. His history, when we succeeded in learning it fully, proved to be as follows: He was very fast, and had been trotted on time for a wager. He fell into the hands of a wild, reckless young man, who often forced him to his utmost speed, utterly regardless of consequences. Almost daily he was overheated, and when taken back to the stable, with his blood at fever heat, was regularly fed on corn. At other times, after these hard drives, he was left to stand in the rain or cold, for hours together, without shelter of any kind. After three years of such treatment, his eyes betrayed signs of weakness, and at intervals he became entirely blind. Was it any wonder?

A nearly similar history might be traced in well-nigh every case of this kind. Different horses evidently possess the ability to withstand the influence of such abuse, in very different degrees. In the vast majority of cases, however, the farmer may rest assured that bad eyes are the fruit of previous bad management.

GENERAL TREATMENT OF DISEASED EYES.

Predisposition to disease seems often to exist in the eyes of some horses. When not the result of injuries of the parts, this generally arises from the presence of fever in the system, or from some deep-rooted and chronic affection. To be of any benefit in such cases, remedies must enter the blood, and radically change the animal's entire condition. Alteratives, though very useful, do not seem to act so readily and powerfully upon the system of the horse as on that of the human being. More vigorous measures must be adopted, in order to secure the same ends.

In the case under consideration, bleeding will be of most essential service. Three pints of blood may be taken from the neck vein, every ten days, for two months, or more than this, if the progress of the case renders it advisable. As to medicines, sulphur is the great alterative in treating the

horse. It is slow in its action, but enters more readily into the blood, and extends its effects to the capillaries and skin more thoroughly than any other remedy that we ever used. The flour of sulphur, although not so strong as the roll sulphur, is much more convenient for the farmer's purposes, as it is already pulverized. Give three doses, every other day, for a week—one-fourth of a pound at a dose—and then omit for a week. Continue giving it in this way, each alternate week, for two months. The preparation mentioned in Section VII, of Chapter XXIV, will also be found an excellent alterative.

If in winter, let the horse have plenty of green food, such as carrots, beets, or cabbage, as long as it can be procured. His diet should always be light and moist, with an entire exclusion of corn.

If there is an inflammation in the eye or about the lids, use the eye-wash freely. Should the lids be much inflamed underneath, scarify them a little. Put a twitch on the horse's nose to hold him still; then turn the lids over, so as to expose their inner surface, and, with the point of a sharp knife, make a number of slight incisions. Let them bleed freely. This will allow the overloaded vessels to discharge themselves, and will thus afford great relief. If necessary, the operation may be repeated two or three times, at intervals of four or five days.

SORE EYELIDS.

Soreness of the eyelids is very commonly the beginning of more serious disease. It is an invariable accompaniment of inflammation of the eye. But there is one form of it, differing from its usual development from that cause, characterized by redness and itching about the edges, which sometimes become raw and mattery. These cases usually prove very obstinate and difficult of treatment, from the fact that the horse is always rubbing them, and so keeping up the irritation and soreness.

TREATMENT.

No application will be of any benefit unless the horse's head can be fastened, which will be the first thing to be done. In a mild case, wet the lids with the eye-wash two or three times a day; in an aggravated or an unusually obstinate case, use the mercurial salve, but very cautiously, the edges of the lids being just touched with it. The utmost care must be taken to prevent it from running into the eye.

MOON EYES.

What farmers call "moon eyes" are the effects of a disorder known to scientific practitioners as *specific* or *periodic ophthalmia*—a disease more to be dreaded than any other to which the eye is subject. It is an inflammation of the sclerotic, or outer white coat of the eye; of the conjunctiva, the delicate membrane covering the front of the eye and the inside of the lids; and of the iris, the little curtain stretched across the interior of the first chamber of the eye. From the extent to which the iris is involved, this affection has also received the name of *iritis*.

The conjunctiva is the part which first, and most noticeably, shows the terrible inflammation. The "white of the eye" wears a deep red appearance; the cornea looks cloudy, and, perhaps, has a few specks; deeper down, the iris has lost its bright color; and the aqueous humor, filling the outer chamber of the eye, looks thick and milky. In fact, the eye is now undergoing complete disorganization. The forces of Nature rally to resist the attack; there is a great and often sudden improvement; and for a time, it seems as though the disease had been baffled. But the same causes which brought on the first attack presently induce another. Thus, for months, or it may be for years, the assaults of disease come and go, each time returning sooner, remaining longer, and evidently of a worse type than before.

The first alternation of improvement is very likely to mislead the owner into the belief that the trouble is entirely

over. He soon discovers his mistake. The attack comes on again; and now the membrane is more inflamed, the eye clouds thicker, and the aqueous humor becomes more milky in appearance, than before. Once more these symptoms almost entirely disappear. A close inspection of the eye at this time shows a slight depression in the general roundness of its form; and, after each successive attack, it seems more and more flattened, and the aqueous humor whiter and thicker.

These periodic recurrences increase in both frequency and duration, until, at last, there is no intermission between them. The eye-ball loses its convexity, the aqueous humor is permanently thickened, the power of the transmission of light is entirely lost, and the horse becomes blind forever.

This form of disease is popularly known as "moon blindness," from the periodic nature of its returns, which a singular notion has associated with the changes of the moon. But it is found that there is no regularity in the intermissions between these returns. They come on much more frequently in the later than in the early stages of the disease, at intervals varying from only six to as much as fifty days.

TREATMENT.

We know of no cure for specific ophthalmia. The disease has progressed too far for the practitioner's skill to be of much avail, and is too deeply seated to be reached by any direct treatment. In most cases the owner stands by, a helpless spectator of the ruin which is being wrought in the eyes of his favorite. The aqueous humor is undergoing a fearful deterioration, which it is not in the power of mortal to permanently arrest. All that can be done is to retard its progress, and to afford temporary relief. In this direction much may sometimes be accomplished. The hints we have given in a preceding section, in regard to the general treatment of diseased eyes, should be acted upon as far as they are applicable. Copious bleeding and a strong dose of salts

will cause the eye to clear up very suddenly. Jockeys have a trick of doing this when they wish to dispose of a moon-eyed horse not entirely blind.

There is another species of inflammation of the eye, called *simple ophthalmia*, which it is not always easy to distinguish from the earliest stages of the much more formidable disease just described. It is generally one of the effects of a cold, or is caused by the presence of some foreign body in the eye, and, for the most part, the inflammation is confined to the conjunctiva. If it does not pass away of itself as soon as the horse begins to recover from the cold, or the irritating substance is removed, it readily yields to treatment in nearly every case.

CATARACT.

Cataract is an opacity of the crystalline lens, an affection which renders this most important humor of the eye utterly incapable of transmitting the rays of light to the retina behind. It is quite commonly, though not always, the sequel of a case of "moon eyes." When it is confirmed, the sight is hopelessly destroyed. The pupil of the eye then becomes so white that even the casual observer will notice it at a considerable distance. A lesser degree of the same appearance marks its progress from the beginning. In our country this disease is happily of rare occurrence.

Our farmers, however, are better acquainted with another affection of the eye which goes by the same name. It is one form of what some veterinarians call spurious cataracts. A small, whitish spot is seen on the eye, generally near the outer corner. It has a peculiarly thick, cloudy appearance, and seems to be of a cartilaginous or gristly texture. Sometimes it increases to half the size of a wheat grain, but is usually a great deal less. It gets no larger, and, in time, Nature will get rid of it without any assistance. These spots generally make their appearance between the ages of three and six years, and disappear within the next three

years afterward. Their duration is very variable, from one day upward. They impair the vision but little, if at all.

GLASS EYES.

Nearly all writers on the horse speak of "glass eyes" as the popular name of *amaurosis*, or *gutta serena*, which is palsy of the retina, the expansion of the optic nerve. A disease of this character must be exceedingly difficult of treatment, and can seldom have any other termination than blindness. Thus the English veterinarians all describe it.

But in this country the term "glass eye" has another and very different meaning. It is applied to a peculiar formation of the organ, which seldom hinders the horse from seeing as well as ever. Very young colts have had glass eyes, and have grown old, without showing any change in the appearance of the eye. During all this time they could, apparently, see as well as other horses, and the same in this eye as in the other. Only one eye seems to possess this peculiarity at the same time, and, except its white, glassy look, its appearance in no wise differs from that of the other. Utterly unlike the symptoms of genuine amaurosis, the pupil is perfect, and the iris is distinct and quite natural. It is most probable that the white ring around the cornea is but the reflection in the aqueous humor of a peculiar color of some of the coatings of the eye, as a close inspection shows the aqueous and vitreous humors in the glass eye to be of the same color, and as clear and transparent as in the other. No treatment is necessary.

The owner of a glass-eyed horse in this country, or, at least, in the Western and South-western States, would be surprised to be told that his animal was less valuable on account of this peculiarity. If it injured his sale at all, it would be solely on account of its singular look.

INFLAMMATION OF THE HAW, OR HOOKS.

One of the most common affections to which the eye of the horse is subject is inflammation of the haw, constituting

what is known all over the country as "hooks." The disease is variously called "bone hooks" and "fatty hooks." Yet there are many among the masses who doubt the existence of "hooks," and the question is often asked whether horses do really have them. To this query only one reply is possible. No hook, or hooks, or any thing else, grows in the eye that does not belong there. If people were better informed concerning the structure and uses of the haw, they would not fall into such errors in regard to the "hooks."

The haw—or "washer," as it is sometimes called—is a little, triangular-shaped cartilage, lying just within the inner corner of the eye, where Nature has provided a cavity, in which it rests when not in use. Being thus stored away, only a small portion of it can be seen when the eye is in health. Its shape is exactly adapted to the convexity of the eye. Like other cartilages, its texture is tough and gristly. It is also very elastic.

The haw serves as a sort of scoop, to pass quickly over the eye and throw off any offending substances which may have lodged upon the ball, such as dust, hay-seed, flies, and gnats. Motion is given it, not directly by muscular action, and yet, at the will of the horse, most perfectly. The arrangement by which this is effected is curious and admirable indeed. The orbit—the cavity in which the eye is placed—is plentifully supplied with fatty deposits, which enable the organ to turn in all directions without friction; and these deposits are most abundant in the part back of the eye, especially toward its inner corner. Powerful muscles surround the eye. These the horse contracts when any disagreeable substance alights upon the eye-ball; by a mechanism almost peculiar to the horse, the eye is drawn back in its socket; the fatty deposits near the inner corner are pressed down upon the haw with such force that it is thrust out, and, darting with lightning-like velocity over the surface of the eye-ball, gathers up the offending particles of dirt, or whatever foreign body is to be removed. Then the muscles relax; the eye and its fatty deposits resume their original arrangement; and the

elastic haw returns to its place, like a piece of well-stretched India-rubber when one lets go of it.

Any one who will note the beautiful play of this tendon, when any thing approaches too near the eye, can but admire the wisdom and kindness of the Creator in providing this important and delicate organ with a means of protection so admirably adapted to its purpose. Its play may best be seen by trying to pull open the lids, or to touch the end of the finger to the eye-ball.

Inflammation of the haw usually proceeds from fever and inflammation of the other parts of the eye, accompanied by swelling. Continued inflammation gives the cartilaginous haw a hard, bony consistency, which it did not before possess; and, in consequence of its own swelling and that of the parts which press upon it, it protrudes from its place under the lids into the corner of the eye, in the form of a large, whitish lump, much to the annoyance of the horse, and presenting a very unsightly appearance. It is often bent out of shape, and is crooked more than is natural. The removal of the haw, when it is in this hardened, enlarged condition, forms what farmers call "cutting for bone hooks." The lump has a fatty appearance, also, since the haw, like the adjacent parts, is supplied with a share of adipose matter. Hence the term "fatty hooks."

A foolish and barbarous practice, greatly in vogue in some sections, removes these bony, fatty lumps with the knife. One fact is patent in regard to this treatment: the little appendage which the Creator has wisely given to the eye, for its protection and comfort, is forever destroyed. In all cases, the eye is greatly impaired, and sometimes nearly ruined. The custom is ignorant and barbarous. It must be so denounced by every person of common sense who knows what the haw was given the horse for, and should not be tolerated anywhere. If those who practice it were compelled to travel all day through the heat and dust, without any means of protecting the eye from the glare of the sun, or the irritation of the gritty particles of dust, they would

better understand the irreparable mischief they do the horse in "cutting for the hooks." It is altogether unnecessary. Time and a little generous treatment, such as tends to remove inflammation, will invariably set matters right again.

TREATMENT.

Occasionally it may be necessary to cauterize the haw, but this will only occur in extreme cases, where the inflammation and swelling are very great. The eye-wash, applied two or three times a day, will generally prove sufficient. There should be warm applications of this to the fatty lump, by using a soft piece of cloth, or some cotton, tied on the end of a stick. Pull the lids apart, and wash the swollen and inflamed parts thoroughly. If the lacrymal ducts appear to be closed, apply the eye-wash to the nose, with a swab of the same kind as that described in connection with the treatment of blind staggers. Slight scarification may do good, in order to relieve the overloaded blood-vessels; but do not think of using the knife for any other purpose. Bleed from the neck vein once or twice, at intervals of ten days. A gallon of blood may be taken the first time, and half that amount the next.

By this treatment, the inflammation will be removed, and the swelling will gradually subside. Some morning, when the owner goes out to look at his diseased horse, the hooks will be missing; bone hooks and fat hooks will have utterly vanished, and the haw will have become so reduced in size as to resume its proper place in the cosy little socket which the God of Nature has provided for it at the corner of the eye.

DIMNESS OF VISION.

Many horses can not see well, although their eyes have no apparent disease. Some are almost blind at night; others have their chief trouble in the daytime, the bright sunshine seeming to put the eyes almost out. The cause of this may generally be determined without much difficulty; the eyes

are either too flat or too convex. A great difference may be noticed in the eyes of different horses, not so much as to size as their shape.

The coatings of the eyes are not equally transparent in all horses, and a similar difference exists in regard to the clearness and refractive powers of the humors. Sometimes the rays of light do not fall properly upon the retina; or, as occasionally happens, the retina may be so small that some of them fall outside of it. When the eye is too full or convex, the rays will converge too soon, and form an image of the object in front of the retina; when it is too flat, they do not converge soon enough, and their proper focus is behind the retina. These conditions may all exist, while there is no trace whatever of local or chronic disease of the eyes.

Old horses are the ones most subject to dimness of vision. Their eyes become too flat, and this produces far-sightedness. The trouble with young horses is generally the reverse; they are near-sighted from the too great convexity of the cornea. Either of these infirmities are likely to make a horse subject to sudden starts and other disagreeable eccentricities. How often may one see a near-sighted horse paying no attention to the approach of an object, until it is quite near, and then, when he discovers it, throwing up his head with a quick start, and other signs of alarm. Such an animal is pretty sure to be an inveterate stumbler, from the mistakes which he is always making in estimating distances.

The eyes of some horses are never clear; the aqueous humor seems unnaturally thick and dark; yet they remain in the same condition, growing no worse, if they do not improve, during a whole life-time. But a horse with such eyes is not perfectly sound; for imperfect vision is always a great defect. He is especially untrustworthy for the road. Great care should be taken, in purchasing a horse, to look well to his eyes, and avoid being imposed upon.

We know of no remedy for dimness of vision. The difficulty is beyond the reach and skill of men or medicine.

HOW TO DETECT A BAD EYE.

When only one eye is affected, it will look smaller than the other, the lids showing a less opening between them. But this may not always be sufficiently conspicuous to be sure of. The more certain method is to get the head between the shade and sunshine, looking out toward the light. If there is any cloudiness, the rays of light passing through the eye will reveal it plainly. A horse with bad eyes is always more stupid and dumpish than others. He will stand with his eyes closed much of the time, and does not notice the approach of any object near so readily as when in health. To a good judge, the eye will not have the bright, healthy look that naturally characterizes it, and the lids near the corner will appear somewhat dry and wrinkled. The latter indication must not be mistaken for the wrinkles of old age.

Inflammation, of whatever kind, shows itself, of course, and needs no further description. It is only when it subsides, in the periodic clearing up of moon eyes, that any one is in any danger of being deceived and practiced upon. If you purpose buying or trading, the best way is to learn the history of the horse, as fully as possible, for some years past, and should there be any suspicious developments, better have nothing to do with the beast.

This subject is still further illustrated in the section upon unsoundness, in Chapter XXIII.

CHAPTER VII.

DISEASES OF THE MUSCLES AND TENDONS.

FISTULA.

This terrible enemy of the horse makes its appearance upon the withers, just at the top of the shoulder-blade—at first usually upon only one side, from which, however, it is very apt to pass to the other. There seems to be a great lack of popular information in regard to it; for, while all know the causes that ordinarily produce it, and also its general location, few stop to inquire what the particular part is which is chiefly affected, or in precisely what manner the disease operates. A bruise of some kind is nearly always its cause. This the horse may receive in various ways; for example, by striking the top of the shoulders in passing through a low stable-door, by kicks or bites from another animal, by the pressure of an illy-fitting saddle, or by rolling upon stones or roots.

A large tendon or ligament is situated upon the top of the shoulders, immediately under the upper portion of the shoulder-blade, where it acts as a sort of pad for the bone to rest upon, and thus prevents the friction of pressure against the ribs. Its scientific name is the *serrates major*—that is, the great saw-shaped—but it is properly known as the "tough leather," or whitleather." This ligament reaches over and across the back, and by a cartilaginous connection is joined to the point of the vertebra, or back-bone. When injured, it is subject to acute inflammation, and from this simple fact result the whole phenomenon and *rationale* of fistula.

In their healthy state, the fibers which compose the *serrates major* look very much like little strings about the size of a small knitting-needle, but when inflamed they become as

large as a pipe-stem. The tendon continues to swell until there is no longer room to contain it under the shoulder-blade, when it is forced out and forms a large, ugly tumor. Neglect presently develops a deep and dangerous abscess, which finally breaks, and, discharging immense quantities of matter, becomes a most loathsome sore, which runs for months, or it may be even for years. From the constant infusion of poison from the tumor, the blood becomes thick and black, the circulation sluggish, and the pulse very full. The horse constantly grows thinner and weaker. Fever is wearing his life away, and death, at last, mercifully ends his sufferings.

Sometimes the inflammation extends to the other side of the shoulder, and *caries* of the cartilages and points of the shoulder takes place. The tissues are destroyed, from which follows a sinking away and dreadful disfigurement. These remain permanent, so that, even if the animal is cured, the horse-dealer condemns him as crestfallen the moment he appears in sight. Few ever arrive at this stage, however, and fewer still ever recover. As the disease was formerly treated, a cure was exceedingly difficult, and the process was, at best, a very tedious and troublesome one. The expression was often heard that it was "worth more than the horse to cure him."

TREATMENT.

Two remedies are recommended, to be used at different stages of the disease. When fistula is discovered, and up to the time that matter begins to form, the corrosive liniment will be found very effectual. It should be applied with a little mop every morning, and if, in the course of ten or twelve days, the swelling has not subsided, the May-apple liniment should be used, as prescribed below. The former will usually answer every purpose at this stage, and, in addition to acting very quickly, has the advantage of being less unpleasant and more easily employed.

If the fistula has been coming on for a considerable time,

however, or if the tumor is so near maturity that suppuration is inevitable, the May-apple liniment is the proper recourse. A thin coating of this should be spread over the whole surface of the tumor each morning, and carefully washed off at night, after which any old grease that may be at hand should be well rubbed on. This treatment should be continued for three or four days, or until matter forms in the little fissures of the crusted skin. When the pus begins to ooze out freely, the liniment may be gradually increased in quantity, and allowed to remain as long as a day and a night, but never more than this. At the end of another twenty-four hours it may again be applied freely, without preliminary cleansing of the surface. It must always be washed off thoroughly before the grease is rubbed on, with a cloth and warm, strong soap-suds.

The use of this liniment will produce effects really astonishing to one who has never before witnessed them. At first it occasions a severe burning and itching, so that the horse will require careful fastening to prevent him from rubbing it off. After suppuration has once fairly begun, however, he will stand in one place for hours together, apparently in the enjoyment of great relief. The amount of matter discharged is surprising, often oozing out from the enlarged pores of the skin in such abundance as to run down the leg to the ground, and stand in a puddle at the horse's feet. When this stage has been reached the crisis is past, and a cure is only a question of time. A few weeks, however, are usually sufficient. The hair, which had come off, will grow out again, the neck will not be crestfallen, and the horse, without a scar or disfigurement of any kind, may be returned to duty hardly a whit less sound than ever.

Though requiring time to carry it out aright, this treatment will cure in every stage of the disease, but is peculiarly efficacious after matter has begun to form. It has been known to accomplish more in four or five weeks than all other remedies could bring about in as many months. Its philosophy seems to be simply the active suppuration

which it induces, by drawing the high local fever to the surface. Two or three weeks generally suffices for the discharge of the matter, the swelling disappearing, meanwhile, with surprising rapidity.

When the liniment is first applied, great care must be exercised not to use it too freely nor allow it to remain too long upon the tumor, as the fever and irritation which it brings on are sudden and powerful, and tend to punish the horse severely. It seems to scald the skin upon the surface before it has time to act on the capillaries and penetrate to the deeper seat of the disease. Even when properly used, the horse gives evidence of considerable suffering for a few days, but this will be relieved at once when suppuration actively sets in.

A few cases of failure with this remedy are to be recorded, but it is believed that they are all justly chargeable to an improper use of the May-apple liniment. In obstinate cases an alternation of that application with the corrosive liniment, each employed for two or three days at a time, will prove very beneficial. Bleeding is indispensable. Fever is raging in the system, and the blood, poisoned by virus from the fistula, is thick and sluggish. Its character must be changed by quick, active, and powerful alteratives, and its quantity lessened by copious bleeding from the neck-vein. A gallon of blood may be taken away the first time, and half that amount again six days later. After this, sulphur and green feed, with the ordinary treatment, will be sufficient.

REMARKABLE CASES.

The history of a few remarkable cases, in which fistula was successfully treated by the remedies here recommended, can scarcely fail to interest all concerned in the care of horses, and who may, at any time, be called upon to combat this formidable disease. They all occurred in the author's own practice during the years from 1847 to 1851.

A valuable young mare, belonging to Mr. Job Hicks, of Gibson County, Tenn., had been suffering from a large fistula

on the left shoulder for about eighteen months. The ulcer had been eaten out with arsenic some time before, and a quantity of matter discharged, but it had now ceased running altogether, and was terribly swollen and inflamed. In the crown of the tumor was an indentation half as large as a tea-cup. The mare was quite thin in flesh, and in every way her condition was bad, with a high fever, a hard pulse, and the hair dry and bristling. This was a case peculiarly adapted to test the May-apple liniment, which was used faithfully, and accompanied with such other treatment as the condition of the patient required. In six weeks the tumor was gone, and all that remained was a small sore. The cure was perfect, and, except a trifling scar, marking the site of the indentation above-mentioned, every trace of the disease was removed.

In the same neighborhood was an old mare, the property of Mr. Joseph Sharp, with a fistula on both sides. It had been eaten out with arsenic—twice upon one side, and once on the other—and the shoulders, still very much swollen, were dreadfully mangled, exhibiting great dish-like indentations where the poison had completely destroyed the tissues. This case, having been on hand three years, proved obstinate in the extreme. Six months were required to effect a cure, yet it was accomplished at last, and no recurrence of the disease ever followed.

The next case to be mentioned was badly managed. Mr. J. P. James had a fine young horse, with an unusually large fistula on the very top of the shoulder, and extending nearly equally on both sides. Matter had not begun to collect, and the fever was terrible. The May-apple liniment was left, with full directions, but being allowed to remain on the tumor for forty-eight hours at once, a thick crust was formed, which soon peeled off, exposing a hard, tough, glazed surface, upon which subsequent applications seemed to have no effect whatever. At that period, 1848, the corrosive liniment had not come into use, and it was only after five months of almost unremitting attention that the sore was finally healed. A

large spot remained, however, on which the hair never grew out again.

A fourth example will exhaust the space which can be given this subject. A horse five years old, belonging to Mr. Robert Ferguson, of Cageville, Haywood County, Tenn.—at which place the writer then resided—was afflicted with an enormously large fistula. The May-apple liniment was applied cautiously, in the manner prescribed in the foregoing pages, and with such happy results that in ten days the tumor had entirely disappeared. In this instance treatment began within three weeks after the swelling was first noticed.

FORMER MODES OF TREATMENT.

Fifteen or twenty years ago there were always to be found one or more cases of fistula upon nearly every plantation in Tennessee. In many instances the sufferer received no attention whatever, or was given away at once as worthless. Comparatively few planters were willing to run the risk of keeping a horse or a mule thus afflicted for months, or, perhaps, years, and meanwhile to undergo the constant and excessively disagreeable labor of doctoring him according to the barbarous practices of the times, only to have three chances out of five of losing him at last. At best, it was poor pay for hard work; for, even when cured, the horse remained greatly disfigured, with shoulders crestfallen and the neck always stiff.

Arsenic was the specific generally relied upon. A deep gash was cut in the crown of the tumor, into which the arsenic was blown by means of a quill, when it was closed. The poison, readily taken up by the absorbents, soon affected not only the fistula, but also the neighboring tendons and muscles, forming an abscess, from which resulted, in the course of two or three months, a disgusting, running sore. Immense quantities of foul matter poured forth; the poison, far infused, ate away in all directions, and tendons, cartilages, and sometimes even bones, were utterly destroyed; it penetrated to the vertebra, the crown or point of which (the

dorsal vertebra) crumbled away, and the skin sunk to the main bone of the back, leaving a hollow from four to six inches deep. As far as the poison spread, its ravages went on. At length its force was spent, the abscess closed, and the horse, with all his unsightly deformities, and often with much impaired vigor, was returned to service. If any animal outlived the months or years of torture which this process occupied, it was because his vital energies were equal to almost any task which the heedless ignorance of man could impose upon them.

Yet this picture, horrible as it is, fails to present in full the awful consequences of this murderous system in many instances. The author has seen the whole line known as "the comb of the back-bone" so much eaten away that the vertebra points were exposed to full view, the sickening discharge of pus and blood, meanwhile, completing a spectacle almost incredible. Sometimes even the top of the blade and of the shoulder-bone became visible, and not unfrequently the fly-worm concluded the barbarous tragedy in the most revolting manner.

Among other common methods of treating fistula were such as burning with a hot iron, scalding with the horn and hot mush of ashes, and running a small sharp-pointed iron, red-hot, entirely through the tumor; also, putting polk-root or corrosive sublimate into the swelling, with results nearly similar to those following the use of arsenic.

It is impossible to recall these recollections without emotions of inexpressible horror and detestation; while, upon the other hand, humanity must rejoice that a dispensation of such ignorance and cruelty has given place to an age of more enlightened and generous views concerning the needs and proper care of that noblest servant of man, the horse.

POLL-EVIL.

This is a tumor that comes on the head, or, more properly, upon the extreme forward part of the neck, just back of the

ears. At this point the bones of the cranium connect with those of the neck, or cervical vertebræ. They are held by very strong cartilages, upon both sides of the neck, but still more firmly by the remarkable tendon, or muscle, on top, called the *serratus minor*. (See section on the muscles and tendons, and also *f*, in sectional view of the head, in Chapter II.) By these means the head is supported and kept steady, and moved in nearly all directions with great facility. From the appearance of the tumor nearly upon that part of the head called the "poll," the term "poll-evil" is used to describe this affection. A better one would be poll or head fistula; for the causes and symptoms of this painful disease are precisely similar to those of fistula upon the withers.

Between the serratus minor and the serratus major—the different parts of *the whitleather*, described in the last section—there is naturally a most intimate connection and sympathy. It is almost impossible that one should be injured without the other having a share in the suffering produced; and it is a well-known fact that cases of poll evil, not unfrequently, can be traced to no known cause, except sympathetic connection with fistulous withers.

When the horse is in sound health, an ordinary bruise on the poll generally produces no serious results; but if the parts are in a feverish state, a slight blow may be followed by what is indeed an *evil*. Next to the shoulders and joints of the limbs, there is no portion of the horse's frame so severely taxed, during the animal's motion, as the muscles and tendons of this region.

It is an exceedingly tender and sensitive point, and a blow from a careless or enraged attendant, may occasion grave consequences. If nothing worse happens, a knot, or lump, of considerable size, is pretty sure to betray the violence which has been employed, and will remain for some time. Such treatment may cause instant death. The author once saw an infuriated driver strike a large horse, with a club, on this

part of the neck. The animal fell dead at his feet. The great spinal nerve was undoubtedly broken.

Poll-evil does not often so seriously affect the general health of the horse as does fistula, being further removed from those great vital organs, the lungs and heart; yet it is marked by great suffering, which the least observant spectator can not help perceiving.

TREATMENT.

Follow the same directions as those given in the last section for fistula. Before matter has formed, use the corrosive liniment; after that period, the May-apple liniment. The difficulties attending the treatment of this disease are the same as those accompanying cases of fistula, and the same barbarous means were formerly employed for its cure.

BOG AND BLOOD SPAVIN.

Bog spavin has its location in the membrane investing the hock-joint, and in the little oil-sacks so plentifully supplied to this part of the horse's frame. Although at the expense of some repetition of what has been said in Chapter III, when treating of bone spavin, it will be best to consider the structure of the joint, and the uses of these little oil-sacks, before proceeding further.

The various joints of the body which are most in use and have the greatest degree of motion are furnished with large, strong tendons, as they obviously need to be. Attached to the extremities of the tendons, and between them and the bones, as also between the tendons themselves, are little bags, or sacks, containing an oily, mucous secretion, whose office it is to prevent friction when the parts are in rapid motion, or are otherwise severely strained. The tendons upon the inside of the hock, at the head of the inner splint-bone, and uniting the *metatarsals* (see 45 and 46, in cut on page 24) with the *tibia* (see 38 in same cut), are of unusual size and strength, in order to perform the severe labor to which they are subjected. It is reasonable to expect that here the oil-sacks should be

larger and more numerous than elsewhere, as here exists greater liability to friction than in any other joint in the whole body. Such we find to be the case.

Violent exercise, unusual strains, and blows are liable to injure these sacks and cause them to enlarge. More frequently, however, they are ruptured, when their contents escape and form a puffy swelling under the skin and cellular tissues. To such accidents, those surrounding the hock-joint are peculiarly exposed; and, from their number and size at this spot, the consequences are at once more noticeable, and really much more serious than when the same things occur in other places.

The oily, mucous secretions continue as before; or, rather, they are increased in quantity, from the effort which Nature makes to repair damages and supply the deficiency in the lubricating material furnished the joint. But in this case Nature fails; for the oil-sacks never heal. There is a constant accumulation of the synovial fluid, and as constant a discharge into the spavin-bag, as it may be termed, under the skin. The enlargement increases to an extent and with a rapidity proportioned to the size and number of the oil-sacks which have been ruptured. Sometimes the swelling makes surprisingly rapid progress, and in a short time encircles the entire joint. It always disfigures the horse very much, and has been known to grow as large as a man's head. In such cases the joint becomes so stiff as to be nearly useless, the play of tendons and muscles being prevented almost entirely.

When a small vein is broken, and the blood mingles with the contents of the spavin-sack, the enlargement is called blood spavin. This is the only point in which this disease differs from ordinary bog spavin.

Lameness is not always a consequence of these kinds of spavin, and especially when the swelling is small, except in cases where the horse is very hard worked; and while they unquestionably constitute a form of unsoundness, a horse thus afflicted may do very well for ordinary service. He may work before the plow, or be hitched to a wagon or

to a carriage, when slow motion only is required; but he will never do for rapid movement. Moderate exercise will not materially aggravate the disease. It will cause but little if any enlargement of the spavin-sack, and will not permanently increase the lameness.

TREATMENT.

Sometimes a local application of the corrosive liniment will prove beneficial in checking the accumulation of the oily fluid, and thus prevent the swelling from increasing. The spavin-sack, if very small, or in the first stages of the disease, may occasionally be dried up entirely, by the same means. The remedy is worth a trial. Not much confidence, however, can be placed in any course of treatment. The difficulty arises from the fact that the oil-sacks lie so deep, and are surrounded so closely by tendons, that no external application seems to reach them directly. As the disease does not entirely impair the animal's usefulness, and does not affect his general health, it will rest entirely with the intelligent owner whether to attempt a cure or not, with the probability of a failure.

The old and absurd practice of tapping the spavin-sack, which is thus transformed into a constantly-running and incurable sore, must be discountenanced by every well-informed person. We trust none of our readers will resort to it in any case. Better do nothing than be guilty of such folly. If the corrosive liniment does not effect a cure, no other remedy need be applied.

WIND-GALLS.

The little oil-sacks already described are most abundant about the hock, the ankle, and the knee, but are by no means confined to these localities; next to which they are most numerous on the legs, below the knee and hock, and also upon the ankles. When those which are situated on the parts last named become ruptured, the swelling which results from the effusion of their contents under the skin, is called a *wind-gall.*

This singularly inappropriate name had its origin in the foolish notion of the farriers, in former times, that the swelling was filled with air.

In their nature and causes, wind-galls are thus seen to be the same disorder as spavin. But the oil-sacks which are injured in the former, are neither so large nor so numerous as in spavin; and, more than this, such irritation and inflammation as is constantly kept up at the joint by the movements of the limbs, scarcely affect the parts where wind-galls appear. Hence the latter never become at all serious affairs, and seldom impede motion in the least degree. They may possibly disfigure the limbs somewhat, and are often evidences of hard usage and bad treatment; but, for every essential purpose, the horse is as good as before. When there are several of them, or if they become unusually large, it is generally an indication that the animal lacks suppleness of joint and limb, and will move heavily. Even in this case, however, he will do as well in the plow or wagon as ever he could.

As we have intimated, wind-galls are caused by either a bruise or a very severe strain—most commonly the former. Such a degree of compression by the tendons as must be necessary to crush and burst open any of the oil-sacks, can only result from a most terrible strain; and yet there can be no doubt that it is not unfrequently produced. It is easy to see that a comparatively light blow, directly upon the point where the sack is situated, resting upon the bone or a firm, unyielding tendon, may readily do the mischief. An egg, when the ends are placed between the palms of the hands, will bear a pressure of fifty pounds, yet a faint blow will break the shell. So with the little oil-sack; and hardly a day passes in which the legs of the horse do not receive blows, which, if they fall upon the exact spot, are sufficient to do the injury.

TREATMENT.

Wind-galls are never removed without great difficulty, and often they defy the most persevering treatment. There

is but one way of exterminating them, and that is by burning the enlargement to a crisp with a red-hot iron. This will be likely to dry up the water in them, and seal the fountains which supply it, and sometimes proves an effectual cure.

The old farriers always pursued this course; but it is attended with great danger. The burning often induces an inflammation that eventually ruins the horse, especially when the swelling is near the joint. When inflammation from this cause is once fairly established, it generally terminates in an incurable ulcer. The morbid secretions and the disorganization of the tissues, which characterize this condition, no remedy seems sufficiently powerful to correct. Nor is this the only danger attending the operation of burning. When the hot iron is applied to bunches on or near the joint, the inflammation, which nearly always follows, is apt to prove of unusual severity, and the joint will become so badly stiffened that its use will be destroyed forever afterward. We can not advise this mode of treatment. Its extreme cruelty, coupled with the risk of ruining the horse for life, is more than sufficient to condemn it entirely.

Some ignorant persons have tapped wind-galls "to let out the wind," and have been very much surprised to find a somewhat thick, yellowish fluid, exuding from the puncture, instead of air, and, to their still greater amazement, have found that they have opened a fountain which they were powerless to close. Nor were these all their troubles. Soreness and inflammation have set in, and grown worse from day to day, and week to week. Very often they have learned, when too late, that they unwittingly ruined a valuable horse. In many instances, a large, ulcerous sore remains, which the practitioner's utmost skill can not heal over.

The only remedy that we can recommend is the corrosive liniment, applied once a day for four or five days, and then omitted for the same length of time, and so continued to be used as long as necessary. The liniment should be well shaken before using, then applied with a little mop, and well

dried in with a hot iron. This will frequently remove wind-galls, but not always. If the abscess containing the water is next to the skin, they can be cured without much difficulty; but when it is under the cellular membrane below the skin, as it more frequently is, external applications will not penetrate to them.

It will hardly be worth the pains to attempt the removal of wind-galls, unless there is inflammation and lameness; in which case the liniment will take away the soreness, and should be applied at once.

CURB.

This is the name given an enlargement which sometimes occurs on the back of the leg, and a short distance below the hock. It is produced by a strain of the strong ligaments which are found at this part of the leg, or, perhaps, still more frequently, by a hard blow. In the former case, it makes its appearance after unusually severe exercise of some kind. The nature of the injury is very similar to that of enlarged hock, described in Chapter III.

TREATMENT.

The treatment will be rest, and a persevering use of the corrosive liniment, as directed for enlarged hock. The horse will be badly lamed by curb, and must be put to work again with caution.

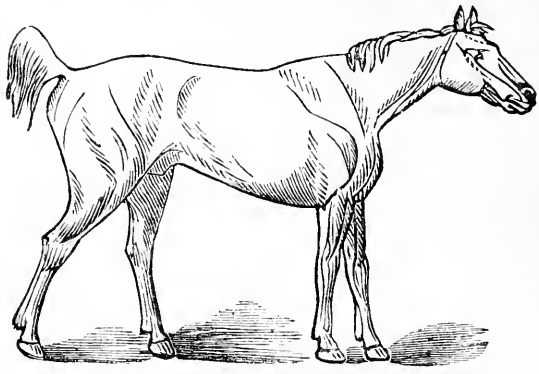
THOROUGH-PIN.

Another watery enlargement that comes on the back part of the hock-joint, inside of the *os calcis*, (see 39, in cut on page 24,) has received the name of thorough-pin. It extends entirely through the connecting membrane from side to side, and hence the first part of the name. But what resemblance it bears to a pin is by no means apparent.

TREATMENT.

Thorough-pin is of precisely the same nature as wind-galls and spavin, and will require the same general treatment.

TETANUS, OR LOCK-JAW.



A CASE OF TETANUS.

With singular fidelity, the artist has here depicted a case of tetanus in the horse. Our readers will be well repaid for a careful study of this engraving. The points to be particularly noticed are the rigidity of the muscles, and the stiffness of the joints; the protrusion of the muzzle; the immobility of the ears; the dilatation of the nostrils, with little or no play; the eye deeply withdrawn in the socket; the haggard, horror-struck expression of the countenance; the tucking up of the belly from the extreme contraction of the abdominal muscles and diaphragm; and the straddling posture of the legs.

Tetanus is one of the most dreadful of all the diseases which attack the horse. Fortunately, it is of comparatively rare occurrence in our country, as is proven by the fact that thousands of persons, familiar with horses all their lives, have never seen a single case of it. In some European countries it has prevailed to a much greater extent, and has engrossed a large share of the veterinary surgeon's attention.

The disease undoubtedly results from the lesion of some functional nerve, producing, more or less rapidly, extreme irritability of the entire nervous system, and terminating in fearful contractions and spasms of all the muscles in the

body. The trouble originates, not in a nerve severed, but a nerve injured—bruised, lacerated, or torn. When a nerve is divided by a common, "clean" cut, its action is entirely suspended, and, bye and bye, the parts heal over as naturally as ever. This takes place in all ordinary incised wounds, without producing any serious consequences. But when the nerve is torn or bruised, its action is increased; it becomes irritated and inflamed; and then, should there happen to be any predisposition to fever lurking in the system, there is great danger that tetanus will conclude the history of the case. We are well satisfied that scarcely any possible injury of the nerves will occasion lock-jaw when the general condition of the animal is that of sound health and entire freedom from fever.

Let any horse, however, be exposed, and take cold, after an injury of one of the nerves, such as we have mentioned, and tetanus could not be courted more effectually. Of course, some degree of inflammation must follow the severing or wounding of a nerve in any case; but if Nature had nothing more than this to overcome, with all the vital forces in perfectly healthful action, the trouble would very soon be over. If the inflammation, on the other hand, finds a co-operative agency ready to extend and aggravate it, as it does when the blood is in a feverish state, it is carried rapidly along the nervous pathway to the great *sensorium* of the body, the brain. From this it reacts in a terrible spasmodic action, in which the tension of the muscles and tendons, in every part and organ of the body, is so fearfully great that the horse dies at last, exhausted by hard work. During the progress of the disease, not only are the muscles and tendons more and more contracted, but the skin becomes tighter, the joints more stiffened, the breathing still more labored, and the power of motion less and less, until, finally, the poor sufferer falls to the ground, to rise no more.

The symptoms of tetanus are usually very obscure at the beginning. Were they recognized at the outset, there would seldom be any great difficulty in applying effectual treat-

ment; but, unfortunately, they are apt to be overlooked, until the disease is so firmly rooted that remedies either can not be used at all, or utterly fail to meet the needs of the case. The disease first exhibits itself in the jaws, but soon extends to every part of the body. Its popular name by no means expresses all that it really is. It is no more an affection of the jaws than it is of the head, the back, or the legs.

In studying the character and developments of this malady, we have been glad to avail ourselves of the observations and researches of others, especially of recognized authorities in veterinary science in Europe, where it has challenged the practitioner's skill so much more than in this country. That excellent writer upon the horse, Mr. Youatt, says:

"Tetanus is evidently an affection of the nerves. A small fiber of some nerve has been injured, and the effect of that injury has spread to the origin of the nerve; the brain then becomes affected, and universal diseased action follows. Tetanus is spasm of the whole frame, not merely of one set of muscles, but of their antagonists also. * * * Tetanus is usually the result of the injury of some nervous fiber, and the effect of that lesion propagated to the brain. The foot is the most frequent source, or focus, of tetanic injury. It has been pricked in shoeing, or wounded by something on the road. The horse becomes lame; the injury is carelessly treated, or not treated at all; the lameness, however, disappears, but the wound has not healed. There is an unhealthiness about it, and, at the expiration of eight or ten days, tetanus appears. Some nervous fiber has been irritated or inflamed by the accident, slight as it was."

In this country, lock-jaw generally proves fatal, not only from neglect in treating it until too late, but sometimes from the actual starvation of its victim. The owner seldom seems to consider that the poor animal needs food quite as much as when in health, or, perhaps, even more than at that time. Disease and the most exhausting form of muscular action are rapidly consuming his strength, while the stomach and

other digestive organs are but little affected. In all probability many horses die from tetanus that might be saved if, in connection with the treatment pursued, some nutritious food could be introduced into his stomach. A horse with lock-jaw will manifest the strongest symptoms of hunger, and should be fed every two or three hours at least. This may be done by placing before him a tub or bucket of thick meal gruel. He will at once try to suck some of it into his mouth, and will actually swallow a little of it, from time to time. There will be no harm in keeping it before him constantly, if he seems to desire it.

TREATMENT.

Bleed freely from the neck vein; it is the only hope in a case of tetanus. The blood-vessels and nerves are distributed throughout the body side by side, and closely sympathize with each other. The blood must be depleted, and to do this is to relax the nerves, and also the muscles through which the nerves ramify.

Let the blood continue to flow as long as the horse can bear it. It is useless to hope for a cure if this essential part of the treatment is not properly attended to. In most cases, it will be best to open the vein, and let the blood run until the pulse grows perceptibly fainter; then to remove the finger or the cord from the neck for fifteen or twenty minutes, or until the pulse rises and the vein becomes full. Now let the blood flow a second time as long as at first. This may be repeated three or four times, when the jaws and the muscles generally will begin to relax. At first the blood is thick, and its feeble stream is drawn chiefly from the immediate region of the brain, while the vessels of the extremities react but slowly. They are allowed time for this, however, by these temporary suspensions of the arterial flow; and there is another great advantage in following this course, from the fact that it prevents drawing away so much blood from the vein as to overpower the vital energies of the horse. If the blood is allowed to run without any intermission until

he falls, there is great danger that, with his stiffened limbs and set joints, he will never rise again. The method of bleeding which we recommend obviates the difficulties which attend the ordinary course, as it relaxes the system, while the action of the vital forces remains uninterrupted.

The nerves must now be tranquilized by powerful opiates, and further relaxation effected by the use of physics. A half gill of laudanum is not a large dose in this case. Mix this with half a pound of salts, dissolved in a pint of warm water. Next, get a horn, open at both ends, and, inserting the small end into the horse's mouth, between the front and back teeth, turn the mixture very slowly down his throat. At the end of six hours, give half of the above dose of salts in the same way. Use every exertion to secure an operation of the bowels as soon as possible. Give one quart of corn-meal gruel, as a clyster, every five or six hours. This will also afford nearly as much nutriment to the system as if it were received into the stomach. Keep a soft bran-mash or thick meal gruel before him, as before directed.

Treatment of another character should next be applied. Put a pint of spirits of camphor and half a gill of tobacco-juice in a gallon of warm water, and in this boil a peck of oats or coarse bran. Have them in a bag, so that they will be loose, and, after boiling for fifteen minutes, apply the bag to the horse's throat, as hot as he can bear it. Fasten it on over the top of the head, so that he can not get it off, or, if necessary, his head may be tied. At the same time spread a good, large blanket or quilt over him, and fasten it. This course will generally throw the horse into a fine perspiration, which will be one great point gained. Change the poultice every six hours for two days, and continue to keep him well covered with the blanket or quilt.

If these directions are faithfully carried out, the horse will probably recover, unless he is suffered to starve to death. A cure is quite easy if the disease be attacked at an early stage.

We may add another simple method of treating tetanus,

without vouching for its effectiveness, as we never had an opportunity of testing it. It is to take the scab from the fore-leg of the horse and pulverize it very fine. This is done by rubbing it on a coarse file. Put a tea-spoonful of this in each ear of the horse, and dust a little up his nose. This, it is said, will so operate upon his nerves and brain that he will lie down and go to sleep; and, after remaining thus for about half an hour, he will get up, apparently well, and with his muscles relaxed, and will then commence eating. We know that this scab contains a powerful narcotic principle, and as the authority for its use in lock-jaw was among the best at the South, it will be worth a trial at least.

A REMARKABLE CASE.

While the author was engaged in the preparation of this work, he was called upon to treat the most remarkable case of tetanus that was ever brought to his notice. It occurred in the village of Petersburg, Boone County, Kentucky, in August, 1866. A young mare, the property of Mr. H. McWithy, and only partially broken, was put into the hands of a wagon-driver, during some of the hottest days of the season, to gentle before the wagon. She was very fat, and had been worked but little before. Although herself quite small, her companion was a very large, strong horse, and the labor to which she was put—hauling logs—was altogether too hard for her.

One day we were summoned in haste to come and see her, as she had the lock-jaw. Her condition was pitiable indeed—the jaws firmly set, every muscle in the body drawn to its utmost tension, and the limbs so stiffened that she could move them only with the utmost difficulty. It was a case of tetanus, resulting from a rare cause, and one not mentioned in any work upon the horse. We shall describe the case and its treatment with some minuteness, as its history may be the means of saving the life of a valuable horse for the reader.

The primary cause of the attack was undoubtedly a dread-

ful over-heating, by which the adipose matter in the body had become softened—almost melted—and, settling down upon the nerves and blood-vessels, had produced suspension of nervous action, and a fearful congestion of the circulation. Every nerve was fully set, and every muscle and tendon contracted to its utmost. Her jaws were not only fixed, but were so much drawn that to swallow was impossible. Medicines, abundant and powerful, were within easy reach; but of what avail was this when not a thimbleful could be made to reach her stomach by any means? It was evident that she could stand upon her feet but a little while longer, and, if once down, she would never rise again. Unless relief could be given at once, she could not live more than from four to six hours at farthest. Her pulse was hard, corded, and fearfully accelerated, beating about seventy-three to the minute. Now what was to be done? We resorted to "the vile practice" of bleeding, and are willing to compare results with either any opposer or abuser of the system.

The neck vein having been opened, half a gallon of blood was permitted to run, when she appeared weak, and the stream was stopped. The blood was the thickest and blackest we ever saw drawn, except in some cases of big head, and for some minutes came very slowly, although the incision was a large one. Her faintness from the loss of so little blood was surprising; but this was in consequence of draining so much from the immediate region of the brain, while the general circulation, as yet, had hardly been affected. In this short time the pulse had become soft and flabby, though its rapidity was not diminished. Some of the bystanders said, "Why do you stop so soon? Bleed her until she faints." But we knew better what was the proper course. Had she fallen, while in this condition, she would have lain there until dragged away to her burying-place. Our object was to relax the system gradually, without overpowering the vital energies, as excessive bleeding, at this stage of the disease, would most certainly have done.

In about twenty minutes she rallied, and the arterial flow

became fuller and stronger. The vein was now reopened by tightening the cord, and again as much blood drawn as before. For four successive times a half gallon of blood was thus taken away, the animal seeming stronger at the conclusion of the operation than at its commencement. In fact, after the first bleeding, she showed no sign of faintness or faltering. By this time the jaws had relaxed so that they could be pulled open half an inch. All this consumed about an hour and a half.

But the dependence was not wholly upon bleeding. While this had been going on, a large, thick woolen blanket was brought, and, after having been wet in cold water, was spread over her whole body. Twenty bucketfuls of cold water were then poured upon her. Instead of killing her, as some might imagine it would have done, this proved of the greatest benefit. It cooled her system, and caused the adipose matter, or fat, to harden and contract; and thus the nerves and blood vessels were allowed space for their proper play again.

In three hours her jaws were so much relaxed that, by considerable effort, she was able to swallow. A fourth of a pound of salts and a gill of laudanum were given, while the same amount of salts was used as a clyster. During the bleeding, her pulse fell from seventy-three to sixty. She remained under the author's treatment for two days, when she was taken home, a distance of two miles. In due time she entirely recovered, and at the date of this writing—two months afterward—she remains as well as ever.

CRAMPS.

A few horses are subject to cramp. This is an irritability and involuntary spasm of a particular muscle, or set of muscles, and is caused by a strain, a bruise, or some similar injury. Horses whose energies have been overtaxed by severe pulling and straining during the day, and who are compelled to stand all night in a narrow stall, are very likely to suffer from cramp in the legs. When the horse tries to move, the muscles, having become stiff and inflexible, refuse to act

for awhile, until the nervous energy is restored; and then they exhibit a spasmodic overaction that produces cramp. The horse seems utterly powerless to control their action, and they jerk and twitch in a most singular manner. The circulation, which has been partially suspended, is soon restored by this exercise, and as the parts become warmed the muscles relax, and their pliancy and elasticity return.

Cramping seems to be a species of temporary rheumatism. It is very painful, and often leaves lameness and great soreness behind it. When this is the case, no pains should be spared to find the affected part, which may be done by pressing upon the muscles of the legs with the hand. The horse will wince when the tender spot is touched.

TREATMENT.

Bleed once, taking away three quarts of blood. Wash the parts well with salt and water, and rub them for some time with the hand or a rough cloth. When dry, apply the corrosive liniment once.

RHEUMATISM.

Very few persons are aware how frequently this disease attacks the horse. Even among professional veterinarians it has received but little attention. Yet many instances of lameness have occurred—cases in which the horse apparently suffered excruciating pain, and was barely able to move his limbs at all—that could be referred to no other possible cause. There is no reason whatever why the horse's frame should be exempt from rheumatism any more than the human. The physiology of the two are very much alike, and exposure or bad treatment will be as likely to bring it on in one as in the other.

Old horses are those most subject to rheumatism, especially when they have been abused or very hard worked. It rarely occurs among younger animals, unless their energies have been greatly overtaxed. Yet exposure and severe usage do not appear to be the only causes of rheumatism. The lean horse,

if otherwise in good condition, is very seldom among its victims. It is the horse well-fed, plethoric, fat, and sleek that is oftenest attacked. The immediate cause of the disease is obstruction of the circulation. It is always an evidence that the blood is too abundant and too thick, as well as too sluggish and irregular in its flow, from which condition proceeds nervous irritability, in the first instance, and next rheumatism, which is but one form of this nervous disturbance localized. Tetanus is an aggravated and general development of the same functional derangements.

Rheumatism affects the tendons and joints, and is accompanied by terrible inflammation and lameness. Although the hips and shoulders are its favorite points of attack, the knees and all the joints of the legs sometimes suffer from it. Cramp is but a milder form of the same disease—a brief, spasmodic rheumatism.

Many other diseases are liable to be confounded with rheumatism. Stiff complaint, so called, is but the general effects of rheumatism located in the joints—in fact, become chronic. On the other hand, many cases which have been doctored as colic or founder have really been acute attacks of this disorder.

REMARKABLE CASES.

Although our space is limited, perhaps we can not do better than devote two or three pages to the narration of two remarkable cases which the writer treated some years since. They show how easy and common it is for the uninformed to make mistakes in the diagnosis of rheumatism.

A gentleman named Hardison, residing in Middle Tennessee, brought his family upon a visit to some friends in Gibson County, in the same State. The distance was about one hundred and fifty miles, which he drove with his family horse, in a carriage. She was a large mare, unusually full and plethoric, and plainly showed the good usage which she had been accustomed to receive. Unless in this journey, her strength had not been at all overtaxed; but for some time previous to making the trip she had been exercised but little.

One morning, after having been driven about half a mile from the friend's house where Mr. Hardison was stopping, and while still before the buggy, she was taken suddenly ill. She seemed scarcely able to stand upon her feet; she trembled all over; great drops of sweat rolled down her sides, and in twenty minutes she was wet with perspiration. Her appearance and motions indicated the most intense suffering, and she seemed unwilling to let her feet touch the ground, as if it gave her great pain. Yet there was an equal disinclination to lie down. Standing with her back roached up, and the most imploring look possible, she was a spectacle to excite the deepest feelings of compassion.

With the bystanders, this was plainly an attack of bots—an opinion in which they were confirmed by the manner in which she kept putting her head around to her sides and fore-legs, and by the continual jerking of the muscles and skin of those parts. As there was no swelling of the abdomen, it could not be colic.

To the author, however, these symptoms indicated something entirely different. A gallon of blood was accordingly drawn from the neck, and some salts and laudanum were given her, and in two hours she was relieved.

If the question is asked, Why give this as a case of rheumatism, when the attack was so sudden? it might be replied that the latter did not pass off so suddenly, for it was two months before the mare regained the use of her limbs sufficiently to be taken home. It was undoubtedly a severe case of spasmodic rheumatism, whose surprisingly rapid development proceeded from causes, in all probability, long pre-existing. This example shows what a terrible enginery of destruction disease may sometimes plant in the system entirely unsuspected.

The animal had seemingly been in the best of health, and was only sick about two hours; yet she became very much reduced, and it required six months to remove all traces of the attack. Her legs, shoulders, and hips were stiff and sore for months. It may be seriously questioned whether she ever

became quite as sound and active as before, or whether she was as well able to withstand another assault of the same disease.

In the winter of 1858–9, while traveling in the northern part of Alabama, the writer encountered another case, which, although very similar to the preceding, presented other features so instructive that we shall give it in full also.

Our place of entertainment for the night happened to be at one of the drovers' stands common in those parts—resting-places for the accommodation of the numerous droves of horses and mules on their way from the great stock-raising regions of Kentucky and Tennessee, to the cotton districts of the South. Here we met the worst case of rheumatism our eyes ever rested on. The victim was a fine young horse, about six years of age, purchased in Williamson County, Tennessee. He had been trained for the saddle exclusively, never having been hitched in harness; had been moderately used, and always well treated. For the preceding seven or eight days he had run loose in the drove, traveling in this manner only about twenty miles a day.

Soon after reaching our stopping-place, we learned that a horse was coming very sick with either colic or founder, and presently he made his appearance. Certainly he was as pitiable an object as we ever saw—his belly tucked up, his back humped, his feet drawn under him, and his expression indescribably woe-begone. He, too, was disinclined to lie down, but finally did so, by giving entirely away and falling to the ground. The groans which followed this performance were perfectly heart-rending. We never heard such from any other animal before or since.

What had brought on the attack? The horse was young, very fat, and, until a very few hours before, had been in excellent health. The day was moderately cool, so that he could not have become overheated; nor had he either eaten or drank too frequently. There was no cause for founder. Examination showed, too, that it was not the feet so much as the knees and shoulders that were tender and sore. As

for bots, the author of this work had been for years defending that inoffensive little creature from the charge of killing the horse, satisfactory reasons being apparent for believing him entirely innocent of the crime. It was not a case of colic, for the symptomatic indications of intestinal disorder were lacking.

Treatment was applied as for rheumatism. It was successful. Bleeding was the first step, a gallon of blood being drawn from the overloaded vessels. Then another of the best of remedies for the horse was administered as a drench—one quart of salt and water, as hot as it could be swallowed. The legs were freely bathed with the same mixture. In one hour the sufferer was greatly better, and seemed nearly free from pain. But a year later he had not entirely outworn the effects of this dreadful attack.

This, also, was a case of spasmodic rheumatism. Yet a degree of mystery attaches to it. An attack so fearful as to leave behind its brief duration of four hours such evil consequences, did not spring up in a few hours or a day. Its causes must have been in existence for weeks, or probably even for months before, the disease, meanwhile, continually accumulating its forces, until, at last, it suddenly overpowered the vital energies and prostrated the horse's strength completely.

But are there no premonitory symptoms to indicate the approach of so terrible a foe? Sometimes there are, but more frequently there are not. Unfortunately, remedies can be prescribed more easily than preventives; yet considerable may be done, in a general way, in the latter direction. Light, moist food, a good pasture, or any relaxing diet, by keeping the blood thin, will tend to the prevention of rheumatism; while dry, hard food, such as heats the blood, and makes it thick and dark, will be likely to bring it on.

TREATMENT.

The treatment has been sufficiently indicated in the history of the case last given. It consists in bleeding from the neck vein, and the free use of salt and hot water, both internally and to bathe the affected parts.

SPASMS.

Perhaps few affections are so common among horses as spasms, and yet no veterinary writer has thought proper to introduce them in his classification of diseases. The reason probably is, that, although well-known to all who possess any familiarity with the ailments of horse-flesh, they so often occur in connection with other diseases that they have been regarded as merely symptomatic in all cases. But sometimes we find them entirely disconnected with any other disorder, under circumstances that forbid the intelligent practitioner referring them to any local affection.

Spasms may be of three kinds—of the nerves, the muscles, or the skin. Although only the second of these properly belongs to this chapter, it will be most convenient to consider all of them in this connection. A minute description of each is a task not without some difficulty. Yet, where is the farmer that has not witnessed spasms of the muscles? For a few minutes they contract violently, with sudden jerks; then the spasm passes away, leaving the animal apparently as well as ever.

Nervous spasms are still more common. The horse suddenly becomes much agitated, trembles all over, and has a wild, frightened look, when there is not the least sign of any cause of alarm. For a few moments his very frame shakes with excitement; but this passes off presently, and he becomes perfectly tranquil again. Such a case is plainly nothing else than one manifestation of nervous disturbance, in which alone all his disquiet and fears have their origin.

Every one knows that in human pathology nervous people are usually very fearful, always imagining something wrong, or some danger near. It is precisely the same with the horse. Many a poor animal has been adjudged to be vicious, and has received terrible beatings for his unaccountable excitement, his reluctance to move, or his supposed perversity, when all this was the result simply of nervous derangement, manifested in the form of spasms, which affected the whole body.

Such a condition is generally produced by there being too much blood in the system, and that too thick. Nervous power is largely concerned in carrying on the circulation, and, when the blood is in this state, must be overtaxed at times. Hence these phenomena, which appear so singular to the horse's driver.

TREATMENT.

Do not be such an ignoramus as to beat your horse when he is suffering from a nervous spasm. Nearly always it is something that your own negligence or bad management has brought on, and is really less chargeable to the horse than to yourself or his keeper. Try the effects of habitual kindness and gentleness, if your horse is subject to such attacks, and, our word for it, you will see a marked and constantly increasing change for the better in a very short time.

If the spasm, of whatever kind, is a severe one, resort must be had to bleeding. Many an excitable, fractious horse will become perfectly quiet and tractable if a gallon of blood be drawn from the overloaded vessels. It will seldom be necessary, however, to take so much as this in a simple case of spasms. Relax the system by giving light, soft diet. This does not mean, however, that you shall starve your horse into weakness and languor.

STRING-HALT, OR SPRING-HALT.

Every member of the body has its appropriate nerve, without whose prompting it could not move. The hips and hind legs are given power and motion through the agency of the sciatic nerve, a branch given off by the spinal cord in the region of the lumbar vertebræ. It is this nerve which most anatomists consider the seat of that singular derangement which produces string-halt.

The disease is a familiar one. Instead of a suspension of the nervous and muscular energy, it is an overaction of both; so that whenever the horse attempts to lift his hind legs, they move by a sudden spasmodic jerk, and are caught up much higher than is natural. In extreme cases, they are sometimes

thrown fairly up against the belly, and with some force. The muscles are but the servants of the nerves, and only exhibit the contractions and jerks that are communicated to them by their superiors.

A celebrated horse in England, that had been afflicted with string-halt in its most aggravated form, was dissected by Professor Spooner, of the Royal Veterinary College, with a view to gaining some light upon the causes of this disease. The result of the examination has been given, as follows:

"On taking off the skin, all the muscles presented their perfect healthy character. There was not the slightest enlargement or discoloration of the fasciæ. The muscles of both extremities were dissected from their origins to their tendinous terminations, and their fibrous structure carefully examined. They were all beautifully developed, presenting no inequality or irregularity of structure, nor aught that would warrant the suspicion that any one of them possessed an undue power or influence beyond the others. The only abnormal circumstance about them was, that they were of a rather darker yellow in color than is usually found. This referred to them generally, and not to any particular muscle or sets of muscles.

"The lumbar, crural, and sciatic nerves were examined from the spot at which they emerge from the spinal cord to their ultimate distributions. The crural and lumbar nerves were perfectly healthy. The sciatic nerve, at the aperture through which it escapes from the spine, was darker in color than is usual, being of a yellowish-brown hue. Its texture was softened, and its fibrillæ somewhat loosely connected together. The nerve was of its usual size; but on tracing it in its course through the muscles of the haunch, several spots of ecchymosis presented themselves, and were more particularly marked on that part of the nerve which is connected with the sacro-sciatic ligament. As the nerve approached the hock, it assumed its natural color and tone; and the fibers given off from it to the muscles situated inferior to the stifle-joint were of a perfectly healthy character.

"On dissecting out a portion of the nerve where it appeared to be in a diseased state, it was found that this ecchymosis was confined to the membrinous investiture of the nerve, and that its substance, when pressed from its sheath, presented a perfectly natural character.

"The cavity of the cranium and the whole extent of the spinal canal were next laid open. The brain and the spinal marrow were deprived of their membranous coverings, and both the thecæ and their contents diligently examined. There was no lesion in any part of them, not even at the lumbar region.

"The articulations of every joint of the hind extremities then underwent inspection, and no disease could be detected in either of them.

"Professor Spooner was of opinion that this peculiar affection was not referable to any diseased state of the brain or spinal cord, nor to any local affection of the muscles of the limbs, but simply to a morbid affection of the sciatic nerve. He had not dissected a single case of string-halt in which he had not found disease of this nerve, which mainly contributes to supply the hind extremities with sensation and the power of voluntary action."

String-halt is seldom sufficiently aggravated to prove a serious detriment to the horse's qualifications for service. The ungainly and even ludicrously awkward appearance which the gait presents, constitutes the only objection in most instances. But we regard it as a great mistake to consider this peculiarity an indication of unusual power. It is an evidence, rather, of bad treatment. The horse has been strained, at some time or other, and the injury then sustained by his muscles has reacted upon the important sciatic nerve.

TREATMENT.

Bleed moderately, taking not to exceed three pints of blood, and repeat the operation at the end of ten days. Apply about a table-spoonful of the corrosive liniment to that part of the hip in immediate connection with the spine, and

also to the back part of the foot. Keep both the hip and the heel constantly sore with the liniment for at least a month, using it daily.

This treatment, with the addition of three or four doses of "jimson" seed, cured one of the worst cases of stringhalt we ever saw.

CHAPTER VIII.

DISEASES OF THE SKIN AND EARS.

As all the unfavorable external influences to which the horse is exposed first come in contact with the skin, we can readily understand why it should so frequently be the seat of disease. When we consider the dreadful treatment to which the poor animal is often subjected, it seems a wonder that the case is not worse than it is. But the peculiar structure of the skin, as already described in the appropriate section of Chapter II, in a great degree protects him from injury, and wards off many of the effects of exposure and bad treatment.

The various affections of the horse's skin have received different names according to their localities, and the different phases which they assume. There is a great sameness in the general symptoms of most of them, as well as in their causes and treatment. They may all be embraced in two classes: First, those which proceed from bad treatment; second, those which are the result of constitutional tendencies. The first of these classes embraces by far the larger proportion of them. One of its most characteristic representatives is the disease called

SCRATCHES.

Universally known and dreaded as this is by all American horsemen, it seems to be a stranger to the English veterinarians; at least, it is not mentioned by any of them so far as we have any knowledge. It makes its appearance on the back part of the foot, extending from the heel to the fetlock, and much oftener on the hind than on the fore-feet. In extreme cases, it has been known to extend upward on the

leg to the joints of the knee and hock, and around to the front of the foot, so as to entirely encircle it. It begins with a thick, dry, scabby covering of the skin, coming in little patches upon the different parts of the heel, which continue to spread until they unite in one solid mass of scab and matted hair.

These scabs present a different appearance from those which occur in any other disease of the skin or legs. They possess an uncommon itchiness, which impels the horse to keep rubbing the parts, if it is possible for him to do so, very often until they are raw and bleeding. This is the origin of the name—Scratches.

The cause of this disease is undoubtedly bad treatment or improper stable management. Let the horse habitually stand in filth and mire when in service, or on piles of hot and steaming manure in his stall, and the skin will become scalded and scabby, and, before the negligent keeper is aware, scratches be fully developed. This end will be much hastened by a bad state of the system—impure blood, derangement of the digestive functions, and general feverishness. It often happens that when other diseases are pressing upon the vital energies of the horse, this annoyance follows in the train of his misfortunes. But these other diseases are usually of those types which are superinduced by the bad management before adverted to. Foul air and filth have poisoned the blood and rendered the entire system an easy prey to the first determined assault of any of them. While the horse may be very thin from both poverty and disease, without having scratches, when these causes are combined with standing in filth and mud, or on a great heap of soft, decomposing manure, it will be a wonder of he escapes this pest. The horse that stands in a dry stable, in a clean and well-kept stall, will rarely indeed be troubled with scratches.

TREATMENT

If the horse is in bad condition and thin in flesh, bleed from the neck vein; but should he be weak and feeble, only

a small quantity—not more than about three pints—of blood must be taken at first, and ten days later, as much more If his strength has not been reduced, it may do to bleed but once, then taking three quarts of blood. In case his general health is vigorous, it will not be necessary to resort to bleeding at all. But this condition will rarely be found in connection with scratches.

The remedy to be applied is as nearly infallible as any thing possibly can be. The corrosive liniment will cure the disease in every stage, and in every condition of the system, and under almost any circumstances. Apply it with a little mop, shaking it up well before using. Turn out about a table-spoonful of it in an earthen cup, and with the mop saturate the affected parts thoroughly. Use the liniment for four days; then omit for two days, and use again. The hot iron need not be employed to dry it in, as this is one of the cases in which it has more effect while on the surface.

Keep the horse out of the wet while applying the liniment, or it will do him little good. Feed light; and if it is the time of pasture, he will need no other diet. In winter, give as much green, soft food as can be procured.

THRUSH.

This disease is characterized by a continuous discharge of very offensive matter from the frog and heel of the foot. The cleft of the frog is from one-fourth to one-half an inch in depth. The exudation of purulent matter from this region sometimes continues for a long time before the inattentive owner becomes aware of it. When thrush has an independent existence as a local disease, it is generally the consequence of standing in a damp, wet stable; or it may be produced by injuries of the frog. There is no disease of the horse's foot but may be, and often is, the cause of thrush.

It is the result of gross negligence and mismanagement in the large majority of cases. It would be a rare visitant of our stables if they were kept cleaner and dryer. The cavalry horse seldom has it, and there is no reason what-

ever why the farmer should encounter it any more frequently than the trooper. We trust that to few of our readers the following advice will be applicable, but those to whom it is can not act upon it too promptly: Throw out the great piles of manure that have been accumulating in your stable, and in which your horse has been so long standing, to the great detriment of his health and vigor, and, instead, give him a good bed of dry straw or sawdust. Do this, and you need have little fear of being compelled to undergo the trouble or annoyance of treating any cases of this disease.

TREATMENT.

The corrosive liniment will prove as efficacious for thrush as it is for scratches, if the affection is local and independent of any other. If some other disease of the foot has caused it, cure that first. The liniment should be applied by wetting a little string of tow or piece of cloth with it, and pressing this into the cleft of the frog and the corresponding part of the heel. Do this at night, and remove the tow or cloth the next morning. Thus continue as long as may be necessary, with intervals of omission every third or fourth day.

CRACKED HEELS, OR GREASE.

This is but another form of the disease, two of whose developments we have already considered. It more nearly resembles thrush, however, than it does scratches. It is entirely confined to the back part of the foot, called the heel—a locality that scratches attack much less frequently, but which is the exact seat of thrush. In respect to the purulent exudations by which it is accompanied, it is still more like the latter.

Some other, and perhaps more obscure, disease of the foot is very commonly the origin of this. In numerous instances, it is not a local disease, but an oozing out through the pores of the skin of a thin matter from some deeper-seated ulceration, generally that attending the disease of either the coffin or the navicular joint, which has been described in Chapter IV.

In most of these cases, the joint last named is the part really affected. But the mischief very often flows from the same external causes referred to in the last two sections—improper stable management, and permitting the horse to stand habitually in wet and filth, or on a mass of rotting straw, saturated with the highly alkaline urine.

It is an established fact in the pathology of diseases, whether of man or beast, that the same causes acting upon the physical system, under different circumstances, may produce quite different results. Hence arises the fact that many diseases belonging to the same class, yet more or less varied in their developments, and designated by totally different names, are often traceable to precisely the same origin. Why this peculiar form of disease in the horse's foot should be called "grease," to the exclusion of others of a very similar appearance, is not apparent from any pathological considerations. The same purulent matter is given forth in thrush and foot-evil as in this. These diseases are evidently most closely related. They manifest the same, or nearly the same, symptoms; they often run into each other, and may have exactly the same causes; and the same treatment cures them. One common title, therefore, might be applied to all of them with perfect propriety; but, for the sake of distinction and greater clearness, they are variously named according to their most prominent and distinctive symptoms. The most striking peculiarity of this disease, and the only one which marks the boundary between it and the others, is the cracked, open heel. Throughout this work, therefore, it will be called "cracked heels." It will be of decided advantage for our agricultural and veterinary writers to accept this American name, and drop the vague term of English farriers, "grease."

In the horse's heel, the skin has one peculiarity not discoverable in any other part of the body. In its healthy state there is a constant secretion and discharge of an oily fluid from the cellular tissues underneath. This lubricates the much exposed surface, and keeps it soft and pliable. It also prevents the skin from becoming dry and hard, as well as from

cracking or chapping, which it is very apt to do. Many causes may operate to obstruct the flow of this oily fluid until it ceases altogether. When this occurs, the skin becomes dry and feverish, with a scurfy, red, and angry appearance. Presently cracks begin to show themselves, from which the long-pent-up oil secretions commence to run; but instead of being a soft, oily lubricator, it is now changed to a foul, yellowish water. If the disease is allowed to run on, the entire heel is transformed into an ulcerated mass of fungous excrescences. The flow of matter increases, and it becomes more and more thick, sticky, and offensive. Such a development marks the disease as entirely local, and originating in entirely local causes.

Cracked heels is not contagious, as many have supposed; yet if one horse has it, the others in the same stable are very likely to exhibit the same condition, sooner or later, because the surroundings of all are nearly identical. Like causes produce like effects. A wet, foul stable, or muddy stable-lot, will be as likely to give this disease to one horse as to another.

TREATMENT.

As before intimated, the treatment necessary is similar to that for scratches and thrush. The persevering use of the corrosive liniment will cure this disease without fail, if accompanied by a reasonable degree of care and attention. When the trouble is first discovered, a few applications will be sufficient to remove it. But if the case is one of long standing, it will prove extremely obstinate; for, by this time, not only will the heels have become badly cracked and a fungous growth have made its appearance, but the general health of the horse will have suffered materially.

Bleeding will not be required unless the horse is thin in flesh, and in a low state of health from the effects of the disease, in which case bleed once from the neck vein, taking two quarts of blood. Give sulphur and resin every third day, in the proportions of two of the former to one of the

latter. Four or five doses will be enough—a quarter of a pound at a dose.

Apply the corrosive liniment with a little mop, until the heel is thoroughly saturated. Shake it well before using, and turn out about a table-spoonful into an earthen cup. It should be applied every other day, until the disease is thoroughly conquered, and all traces of inflammation, as well as of fungous growth, if any such there were, have entirely disappeared. The liniment often forms a thick scab upon the skin, so dry and hard that the remedy almost ceases to act. This is a sure sign that the case is progressing to a happy issue. When this occurs, the liniment may be omitted for several days, and the part kept well greased until the scab comes off, when the applications may be resumed. Such a course may be continued as long as necessary.

Keep the horse out of the rain and wet while the liniment is being used, or, at least, for six hours afterward. The applications had better be made at night. The pasture is the best place for the horse during the day, but he should not be turned upon it until the dew is off in the morning, or the grass has dried after a rain. If at a time of year when there is no pasture, give him as much green, succulent food as can readily be obtained. At night house him in a clean, dry stable.

The horse must have rest. To work him while thus diseased is not only unmerciful, but it may endanger his life, and will most certainly prevent a cure. But men often say, "I can not do without the services of my horse; they are really indispensable." Very well; we have this only to say: You must take your choice either of getting along without him for the little while necessary to effect a cure, or of doing without him altogether, as you certainly will have to do if the disease goes on unchecked. If you keep him at work, you have no right to look for any other result than some local disease that will ruin him forever.

Of one thing we feel certain: if the owner were half as badly afflicted, he would contrive some means by which to

do without his own services until he had recovered. Duty, mercy, and self-interest all plead in favor of a similar exemption of man's faithful servant, the horse, when diseased and suffering.

A singularly obstinate case of cracked heels was cured by the treatment above prescribed, at the village of Petersburg, Boone County, Kentucky, in the summer of 1866. A young stable horse, belonging to Mr. J. Nelson Green, postmaster at that place, had this disease in a very aggravated form. The case had been treated by a professional veterinarian for some time, and finally given up as incurable. The writer then began treating it with the corrosive liniment. A thick scab was formed presently, but the parts were kept well greased, and by this means it was brought off. The applications were then renewed, with like results and treatment. After the fourth alternation in the use of the liniment, the last signs of the disease vanished entirely.

SWELLED LEGS.

Another form of disease intimately connected with cracked heels, and in many cases only an extension of it, is that which is appropriately known as swelled legs. The hind and sometimes the fore-legs of the horse are subject to an enlargement having its origin in the cellular tissue underlying the skin. This tissue is the thin, white membrane that attaches the skin to the muscles, and extends not only around the legs, but is spread over the entire body.

Nature has filled all the interstices between the fleshy parts and the outer covering of the body with minute sacs, or close cells, filled with a watery secretion. They constitute the cellular tissue, and act as little pads for the skin, which everywhere rests upon them. All our readers practically familiar with the operation of skinning a beef must have noticed the watery secretions oozing out as the knife has divided the little sacs of the cellular tissue. In many parts of the leg devoid of muscle this tissue is the only substance which intervenes between the skin and the hard, unyielding surface

of the bones; and hence these parts are peculiarly liable to injury from the effects of blows and concussions. Here we find these little sacs especially numerous. It is another exhibition of the wisdom and goodness of the Creator, which the whole science of anatomy every-where reveals; and, again, we must admire the incomparable design and perfect finish of every thing in Nature, all which is his handiwork.

But what was intended as an instrumentality for the horse's protection, under some circumstances, becomes the seat of very great distress and suffering. Terrible inflammations set up in the cellular tissue, the leg becomes dreadfully swollen, and the skin puffs out all around the limb, as though it had been stuffed and pressed out to its utmost tension. The leg grows very lame and stiff, and, after a time, cracks appear, from which exudes a whitish-yellow, watery matter, similar in appearance to that which characterizes cracked heels. The latter are generally, but not always, found in connection with swelled legs, and very often the two diseases run into each other.

Sometimes the swelling of the legs comes on with astonishing rapidity—perhaps in a single night—and then disappears almost as suddenly. Such phenomena usually indicates nothing more than sympathy with functional derangement in some other part of the horse's frame. The disease has not assumed its chronic form. What has yet occurred is only a premonition of worse things to follow. If these warnings were but understood and heeded, as they should be, a painful and obstinate disease might now easily be averted.

"Misfortunes never come singly," says the old proverb, and rarely does the history of this complaint tend to disprove its truth. Swelled legs is so intimately associated with other diseases that, in many an instance, it is an impossibility to decide which is the cause and which the effect. They are continually running into and aggravating each other. At the root of all of them, however, the careful investigator may discover one of two or three primary diseases, in the great majority of cases. These are the diseases of the navicular and lower

pastern joints, and that most fruitful source of mischief in the horse's limbs, hoof rot.

All these direful evils that wait upon the horse are stimulated, and, in fact, often brought into existence, by both local influences and constitutional tendencies. Under the first head, we include exposure, insufficient or unwholesome food, irregular feeding, hard usage, improper stable management, and a foul atmosphere; under the other, a feeble state of health, impurity of the blood, the presence of fever, and the like. Several of these causes, acting together, can not fail to bring on one or more of these diseases with great celerity. Two of them, indeed, are often enough to do the mischief most effectually.

When the disease takes on the form of swelled legs, local inflammation is excited in the cellular membrane. The cracking open of the skin is but Nature's mode of discharging the accumulations of diseased water beneath, which ooze out and run down the leg.

The foregoing we believe to be a fair history of this affection and its many kindred ones.

TREATMENT.

Nothing can be expected but that the case will prove obstinate, and the improvement very gradual. At the beginning of the treatment, take three quarts of blood from the neck vein. Apply the corrosive liniment with a little mop, in the same manner as directed for cracked heels; but this may be done every morning, without any intermission, until the swelling has entirely abated. Give daily a quarter of a pound of sulphur and two ounces of resin, both finely pulverized, for three or four days. Put this in some meal or bran, and if the horse does not eat it, let him have no other food until he does.

His diet should be light and moist, pasture being preferable. Let him have rest, and a good, clean, dry stable, that he may make the most of it. Keep him out of the wet, especially while doctoring him.

This treatment may be depended upon to effect a cure. It has done so in a large number of cases where other remedies have entirely failed.

AN ILLUSTRATIVE CASE.

In support of the statement just made, the history of one case may be cited, from among numerous reminiscences of a similar character. It occurred in the winter of 1856–57.

Colonel Jarmon, living in Wilson County, Tennessee, had a young stable horse afflicted with a swelled leg of fearful dimensions. The disease was developed in its most aggravated form. The hind leg had swollen until, from the hock to the hoof, it was a mass of putrid matter. It was badly cracked open, and the yellow, watery discharge was flowing from it abundantly. Yet the general health of the horse was not seriously impaired, and there was but little fever except what arose from the diseased leg.

The previous history of this attack was a common one. Disease of the foot and bad stables were the sources of all the mischief. The whole list of remedies known in that part of the country had been tried, during several months continuously, but with such utter lack of success that the horse had grown worse and worse, and the general opinion was rapidly settling down into the conviction that it was useless to attempt any further treatment.

At this juncture, Colonel Jarmon having applied to the author, the corrosive liniment was recommended, and a servant was immediately dispatched to Nashville, where the medicine was prepared, under our direction, and sent out to the farm. Special directions for its use had been given before leaving, and were strictly carried out. The horse was effectually cured, and became as sound and well as ever.

SWELLED ANKLES.

This is an affection of a much milder type than the preceding, and, as its name implies, is confined almost entirely to the ankle joints. It is intimately connected with swelled

legs, of which it is nearly always a precursor. Some horses are extremely subject to swelled ankles. At night the parts show no signs of enlargement, but in the morning they are much swollen, and manifest a considerable degree of heat. These symptoms disappear before night, and every thing seems right again. This condition of the joints may last for months, and has been known to trouble some horses for years. That it is attended with great uneasiness and some real pain is sufficiently evidenced by the efforts which the horse is continually making to rest his feet, his disposition to lie down, and the relief which he manifests in doing so. In such cases, a diseased condition of the feet is invariably chargeable with these developments.

Less frequently the origin of swelled ankles may be traced to the disease of the navicular and lower pastern joints; and occasionally it seems to be simply the result of constitutional tendencies—a plethoric condition, a superabundance of blood, in connection with hard work and severe straining. But in nine cases out of ten, the evil proceeds from the hoof rot. The fever and heat arising from the diseased condition of the bottoms of the feet, inflame the membrane of the joint under the skin, and it enlarges while the horse is resting; but exercise restores the healthful action of all the parts, and the swelling disappears.

If the symptoms of swelled ankles are not met by appropriate treatment, swelled legs, cracked heel, or scratches will be almost certain to supervene, sooner or later.

TREATMENT.

The first thing to be done is to remove the cause of the swelling by curing the bottoms of the feet. Apply the corrosive liniment to them freely every day for four or five days; then omit for two or three days, and resume the applications as before. Examine the heels, to see if they show any soreness, or whether there is any appearance of thrush. It may be well to apply the liniment to the heel also, to be certain to reach any disease which may possibly be lurking there.

When the bottoms of the feet are well, the ankles will swell no more. In those rare cases where the swelling proceeds from plethora, bleeding will be proper.

The best diet will be something relaxing. An alterative will be found beneficial in most cases. For this purpose, the powders mentioned in Section VII, of Chapter XXIV, may be employed.

SURFEIT.

Unlike the disorders we have been thus far considering in this chapter, surfeit is a general disease of the skin, instead of a local affection. It is usually of a mild type in this country, and seldom does any particular injury; and if the horse can have the privilege of a good pasture, it will generally go away of itself. It generally makes its appearance in the spring, either at the time of shedding, or immediately afterward, when the skin is more nearly bared and exposed than at any other period of the year.

Surfeit always indicates a thick and impure state of the blood. It is not often an evidence of a settled unhealthfulness of the general system, or of any chronic disease; for sometimes the best of horses are troubled with it. But it does tell, very frequently, of neglectful keeping and poor stables, although horses occasionally have it amid the most favorable surroundings possible.

The blood being too thick and the circulation too sluggish, when the hair falls off, the skin is suddenly exposed to the variations of temperature, and other atmospheric conditions, and, perhaps, to cold rains and winds. The horse is chilled, slight inflammation arises, and the cuticle of the skin becomes hard and dry, from the closing of the pores and the retention of the oily secretions, whose proper office is to moisten and lubricate the surface. Little pustules appear upon the skin, and from the tops of these exudes a thin, whitish, oily matter. It is the long-pent-up unctuous secretion which is now escaping, somewhat changed by disease. It flows only in very minute quantities, and not much faster than in health. The little, scabby excrescences which it

forms upon the skin, thickly cover the shoulders, neck, sides, and the back parts of the fore-legs.

When the skin is in the feverish condition that often characterizes it about the time of shedding, a variety of causes may produce a determination to surfeit. The eruptions may be thrown out very suddenly, not only by exposure to cold, but by the horse cooling off very quickly after having been overheated, or by drinking large quantities of water. They sometimes make their appearance in the course of a single night.

A species of quick surfeit is sometimes the occasion of great alarm to the inexperienced, from the apprehension that it was farcy, by which name surfeit is called by thousands of American farmers at this day; but it has none of the distinctive symptoms of that fearful scourge. Surfeit may, very rarely, degenerate into farcy, but this can only be when other powerful predisposing causes tend to the same result. A number of other diseases will be more likely to run into farcy than will this simple affection of the skin. This subject has already been adverted to in the section on Farcy, in Chapter V.

TREATMENT.

Not much is called for in the way of treatment. Bleed freely, taking three quarts of blood from the neck vein, and give two of the ordinary doses of sulphur and resin. If the case seems obstinate, anoint the surface on which the surfeit-knots have broken out with a mixture of sulphur and lard, a spoonful of each. Do this at night, once or twice. Turn the horse out to pasture, let him have a few days' rest, and all will come out right.

MANGE.

Mange is the only disease into which there is much danger that surfeit may degenerate. They are of the same type, but mange is much more aggravated than the other, and is also highly contagious. They are produced by the same in-

fluences; but while surfeit may run into mange, mange is entirely beyond surfeit.

This disease is the offspring of negligence and filth, and is generally found in connection with emaciation and poverty. A horse in good condition may have surfeit, but even if the infection of mange should be communicated to him, it will never reduce him to the condition that farmers term mangy. The very idea of mange is universally associated with starvation, wretchedness, and misery; and an old, poor, mangy horse, out on the bleak commons or in an old field, tells such a history more plainly than could any words.

The first appearance of the disease is a scabby eruption of the skin. The cuticle, or scarfskin, becomes broken into little pieces like scales, which peel off, leaving the parts beneath raw and sore, and often bleeding. Before this, the hair will have come off, exposing the skin, which presents a dirty, brown appearance, and is loose, flabby, and puckered. It is covered with scales, and raw, red spots. A terrible, burning itching accompanies these symptoms, by which the horse is impelled to a continual rubbing, until it seems as if he would tear the skin off. Every-where he rubs he leaves the scurf, or dandruff, and every animal that repeats the operation at the same place is liable to take the disease, and is very certain to do so if he is poor and feeble. Mange is exceedingly infectious; but, although cattle, hogs, and even dogs may receive the disease from horses, it is never communicated by them to the latter.

The least contact, however, is sufficient to impart the disease from one horse to another. It is very dangerous to use the same brush or curry-comb for a well horse that is employed in grooming a mangy one, or to make a similar exchange of collars. Infection seems to be communicated to the stable also, but may easily be counteracted in the manner we shall lay down shortly.

Cases of this disease are more rare than formerly, thanks to the bettered condition of the American horse, from the increasing enlightenment of our farmers. Judging from the

descriptions which the English veterinarians give of mange, it must exist in a materially worse form in Great Britain and on the continent than in this country. So mild are many cases here, that a single bleeding, with the run of a good pasture, will bring about a cure almost without medication or other treatment of any sort.

The disease may be successfully treated in all its stages, but will hold out in proportion to the length of time it has been running, and the reduction of flesh, strength, and vigor which it has occasioned. A lean, emaciated, mangy horse it is a no small task to cure, while one with tolerable flesh and scarcely impaired health will recover with the aid of but very light treatment.

In the case of the poor, feeble animal, the disease is constitutional. It has been brought into being by poverty and debility, by the lack of a sufficient degree of vital energy to throw out the unctuous secretions to the surface of the skin. It affects the blood and general system to a sad extent. Constitutional remedies will here prove absolutely essential. In the case of the horse in a passable condition of health and strength, mange is the result of infection only, and extends its effects little, if at all, beyond the skin itself. Local treatment will readily remove it, and, as before intimated, the forces of Nature will sometimes prove almost sufficient to throw it off without additional assistance.

TREATMENT.

Bleed the horse in proportion to the hold which the disease seems to have secured upon the system. We do not believe, with the majority of writers, that moderate bleeding of the horse, while diseased, tends to enfeeble him. Our experience leads to an entirely opposite conclusion. We have repeatedly taken the diseased horse when so low that he could not rise to his feet without help, and, after bleeding him freely, have seen him begin to amend from that time, and continue to improve until quite well. This subject will be more fully discussed in the section on Bleeding, in Chapter XV.

Bleeding, then, is indispensable—one time in a moderate case, and twice in an extreme one. Three quarts will be about the average quantity of blood to be taken, which should be from the neck vein. If a second bleeding is resorted to, it should be ten days after the first.

Anoint the entire mangy surface with the mercurial salve, applying it with a little mop or rag, and rub it in thoroughly. Use as small a quantity of salve as can be made to effect the purpose intended, which is to spread a thin coating of it over the entire skin. As a general thing, one application will be enough. If it is necessary to repeat it, however, wash off the mangy surface with strong soap and water, and, as soon as the skin is dry, apply the salve again, as before.

Another remedy is to make a salve by using equal parts of the corrosive liniment, sulphur, and lard. These, well mixed, and applied as directed in the last paragraph for the mercurial salve, will effectually kill the mange. The corrosive liniment should be well shaken before being turned out. It will be better to use a very little of this ointment and rub it in thoroughly, than to apply a much larger quantity without the rubbing.

The next step in the treatment will be to give the old and reliable remedy, sulphur and resin. A quarter of a pound of sulphur and two ounces of very finely pulverized resin will constitute the dose. Give this every third day, for a period of twelve or fifteen days.

After this, the best medicine will be that furnished by a good, green pasture, which will do more to "bring out" a mangy horse than any thing else in the world. At night put him up in a dry, clean stable, and let him have plenty of oats or chop-feed. Poverty has been the cause of the mischief. You should labor to improve his condition and flesh. Fill out his flabby, puckered skin with sound, healthy muscle, and mange will disappear. It can not live and flourish in connection with proper care and a good condition of the horse.

As regards infection, all danger will cease as soon as the salve has been applied. The stables should be washed with strong lye or a decoction of tobacco. A solution of sulphur, or chloride of lime and water, will form an excellent substitute for this purpose. Any one of these will entirely destroy the infection.

If a horse, in good condition, has taken the disease by rubbing after a mangy companion, the bleeding may be omitted altogether. The remainder of the treatment should be carried out, except that, in his case, only two doses of sulphur and resin need be given.

HIDE-BOUND.

This is a skin disease of a peculiar character. Although similar to the mange in respect to the causes which produce it, it is neither an infectious nor an eruptive disorder, and the condition of the skin is the very reverse of flabby and puckered. The flow of the unctuous, lubricating fluid through the pores is entirely suspended, and the hide becomes dry and hard, not unlike what it would be if it were taken off and hung upon the fence to dry. While hide-bound is a very distinctive name, the term dry-hide would be equally appropriate, or perhaps still more so.

It is an affection not only of the cellular membrane, and the watery secretions contained in its little sacs, but also of the skin itself. Not long does this remain dry and hard before it loses all its flexibility. It adheres closely, almost immovably, to the ribs, the legs, the neck, and, in fact, to every portion of the body; and it becomes utterly impossible to gather it up in folds with the hand, as one can easily do when the horse is in health. The hair, robbed of that brightness and glossiness which is its peculiar beauty in the arrangements of Nature, looks dry and dingy, like the hair upon a dead hide.

Hide-bound indicates a diseased condition of the system, generally from derangement of the vital functions. The blood is thick, dark, and feverish, and the circulatory and se-

cretive processes morbidly and sluggishly performed. How greatly digestion is impaired is shown by the appearance of the excrement, which is dry, hard, and black.

It is not so much itself a disease as it is the fearful effects of some other disorder raging in the animal's system. It is an invariable accompaniment of big head. Glanders will produce it, and so will farcy, founder, and distemper. Bad cases of swinney, big shoulder, and lock-jaw, have this among their final developments. The fever which attends these dreadful complaints dries up the watery secretions of the system, and the hide shrinks and shrivels closely to the body.

TREATMENT.

The treatment will be prolonged and tedious, and will be productive of results but slowly. Especial attention must be paid to the disease which has brought on such a condition of the skin, and not until that has been cured can we hope for a favorable change in respect to the latter. The predisposing disease, whatever it may be, must be treated directly, as prescribed elsewhere, in its proper place.

Bleed three times, at intervals of ten days. The first time, take four quarts of blood; afterward, two. Give the "jimson" seed every third day, until the stiffness has been entirely removed. Of this a table-spoonful is the proper dose. Let the horse have plenty of sulphur and resin, in the usual proportions. Especial attention must be bestowed upon the horse's diet and to stable regulations. Instructions have been so fully given in regard to these points in the preceding sections of this chapter, that there can be no necessity for repeating them here. Pasturing will do more than medication to cure hide-bound.

STIFF COMPLAINT.

This seems to be a disease almost peculiar to the Southern States. It is another and aggravated development of the symptoms of hide-bound. The skin is dreadfully dry and

contracted, fitting so closely about the joints that they lose their suppleness and grow so stiff that the horse can not move them without painful exertion. The muscles and tendons, especially those of the legs, become stiff, and fairly seem to contract. The horse's movements, thus seriously retarded, are dull, heavy, and stumbling.

TREATMENT.

Bleed copiously from the neck vein, removing at least a gallon of blood. This will relax the system and stimulate the lagging or suspended functions of secretion. The necessity for bleeding arises, not from a superabundance of blood, but from its diseased condition, which retards it proper circulation, and eventuates in more or less of fever and inflammation. The absorbents of the system act with such difficulty that medication is of little service as a means of purifying the blood. In fact, our experience has convinced us that alteratives, so called, do more harm than good during such a state of suspended functions; for they can not be taken up in any quantities and conveyed into the circulation, but linger in the stomach and intestinal canal, which they irritate, and thus, instead of allaying fever, actually excite it. The benefit of bleeding is that it prepares the way for alteratives to act promptly and energetically.

Bleed copiously two or three times, as directed for hide-bound, the blood being permitted to flow until it changes from a dark, almost black, color to a bright, healthful red, or until the pulse falters. This course will relax the system, and relieve the vessels of their impure, turgid blood.

The "jimson" seed, which is perhaps the most powerful alterative in the world, meets this case exactly. It enters freely and rapidly into the blood, relaxes the capillaries, opens the pores, and sends out the retarded secretions to soften the skin once more. Give a table-spoonful of the seed, each morning, in some meal or bran, until the patient gets better. Let the horse have an abundance of sulphur and resin at the same time, the ordinary dose every other day, in some meal

or bran, which compel him to eat by giving nothing else until it is gone.

A horse with stiff complaint must have rest. No one possessed of any feeling would put such an animal to service, when every movement must give him pain.

WARTS.

These are little tumors or excrescences, of various sizes and shapes, that come upon the horse's skin, generally accompanying plethora, high feeding, and limited exercise. Young horses are oftener annoyed by them than older ones. Jacks are seldom free from them. They are of two kinds—seed and blood warts.

Seed warts are generally small, and usually make their appearance on the eyelids, the nose, and the sheath, and adjoining portions of the belly. They grow in patches, and have little hard points, or grains, which are known by the name of seeds. They have a connection with the cuticle, and extend downward to the cellular membrane, which is the source of supply to their growth. At the base of each seed, where it has its origin in this membrane, is what is popularly called its root, which must be destroyed in order to remove the wart. Seed warts indicate a morbid condition of the humors of the skin, but do very little harm, and often go away of themselves.

Blood warts are more serious affairs. They are a fungous growth of flesh from the cellular membrane, are of a spongy texture, and filled with little vessicles from which blood exudes freely upon every slight irritation. Their favorite locations are the hock and knee-joints and the pasterns. Sometimes they are found upon the sheath and neighboring parts. They are most numerous upon those surfaces where there is unusual irritation, or where foulness of any kind is permitted to collect; but, like seed warts, they have been known to grow on all parts of the body.

The blood wart is always disposed to spread and enlarge, and on the knee or pastern will sometimes extend entirely

around the joint. When one makes its appearance, it is to be regarded as only the harbinger of many more. In the winter of 1858–9, we saw a wart on the pastern of the hind leg of a horse, encircling the whole joint, which was nearly twenty inches in circumference. It consisted of five or six excrescences of different sizes, each of them very sore, raw, and bleeding. The animal was a fine young mare, of good size and form, but at that time feverish and in quite low condition.

The blood wart is occasionally found hanging in the form of a pellet, connected with the skin by a neck or stem. When this is the case, it is easily removed.

TREATMENT.

If the wart is of the kind mentioned in the last paragraph, tie a waxed cord around the little stem of the wart as tightly as it can be drawn. This completely stops the circulation, and, of course, cuts off all nutrition; and, in a few days, the stem will separate from its connection, so that the wart will drop off.

In treating other warts, a strong solution of caustic potash will be the best remedy for eating down the excrescence and killing the seed. Take of crude potash about one pound, and, after allowing it to remain exposed to the air until it dissolves, add a small quantity of water. Touch the end of the wart each morning—or, still better, each morning and evening—with this solution, by means of a little mop. After each application, the dead matter on the top of the wart should be scraped or thoroughly washed off before making another. Three or four days will be long enough to use the solution continuously. Then omit two days, and apply again as before.

Great caution will be necessary, not only in confining the application to the wart, but also to prevent the potash from afterward spreading to the healthy surface adjoining. Severe sores have sometimes resulted from a careless use of this powerful caustic. To guard against the possibility of such injuries, take a thick piece of paper and cut a hole through

it of the exact size of the wart, and, having lain it upon the latter so that the top of the wart will protrude through the opening, apply the caustic solution, as before directed. A still better method, and the one which should always be pursued in cases of blood warts, is to surround the wart with a coat of tallow for about half an inch, on all sides, and then apply the caustic.

For blood warts, the application may be continued each morning and evening, without intermission, until they are destroyed. Sometimes the wart will bleed too freely while undergoing this treatment, and, in very extreme cases, it may be necessary to check this by searing with a hot iron. After this, suspend treatment for two or three days. Should the legs swell badly, as they often do, intermit the applications in the same way. As a rule, however, the practitioner's efforts for eradicating blood warts can not well be too vigorously prosecuted. In very bad cases, he should begin by bleeding, in order to relieve the overloaded vessels; and he might profitably substitute diluted nitric acid for the solution of potash. But this must be handled with the utmost possible caution, following the directions above given.

As soon as the wart is properly reduced, apply a small quantity of the corrosive liniment, each morning, with a little mop. Continue thus for four days; then omit for as many more, and apply again. During the periods of intermission, the wart should be kept well greased, coal oil being better for this purpose than any thing else. Before applying the liniment again, the oil or grease must be thoroughly washed off with soap and water.

The removal of small seed warts will not require such vigorous measures as those above laid down. Bleeding from the neck vein, with two or three doses of sulphur and resin, will generally exterminate these little fellows. Sometimes they disappear without treatment of any kind. Unless they come on the joints, they are not worth troubling about. The usual diminutive seed warts on the nose and eyelids may be suffered to remain undisturbed.

Not so with the blood wart, however small its first appearance. Attack this at once, for now it may be easily conquered, while continued neglect may enable it to attain such strength and vigor as to defy all treatment.

Some danger attends cutting off a large wart, from the obstinate hemorrhage which may ensue. Only the searing will close the vein in such a case, and this may give rise to a dreadful inflammation.

SORE NOSE.

The noses of many horses are sometimes discovered to be sore, and incrusted with scabs, when no other disease is apparent. This condition may be the result of constitutional debility; but it is, in the Southern States, more frequently produced by a certain poisonous weed that grows in those latitudes, and which, from its peculiar effects upon the horse, is there known as "sneeze-weed." It is a plant, growing about one and a half feet high, and stands very thickly upon the ground, which, at some seasons, is covered with the old petals of its yellow blossoms and the leaves which fall from its stalks. The fine particles of these the horse snuffs up into his nose, when grazing near the weed, and they create sores upon the outside of the nostril. Especially is this the case when the animal feeds in such places early in the morning, before the dew is gone. At that time, the green weed itself will poison the nose. Young colts are the most easily affected by these agencies, and very often have noses perfectly covered with scabs. At one time, the opinion was almost universal at the South that "sneeze-weed" would kill, not only horses, but even cattle; but, although extremely poisonous, there is no sufficient ground for believing it to be so deadly as this.

The nose is frequently poisoned by other weeds and vines, many of which, though perfectly harmless when taken into the stomach, will seriously irritate and fester the skin. The "jimson weed" will poison the nose of cattle and sheep as well as of horses; and yet all of them have been known to

eat quantities of both its leaves and buds, not only without detriment, but with positive benefit to health.

TREATMENT.

The mercurial salve will be the proper remedy in this case. Apply a very thin coat of it to the sore parts, and rub it in well with a little mop. It may be best to mix the salve with equal parts of lard and sulphur before using it thus. Anoint the parts each morning, until the sores and scabs are all gone.

SADDLE GALLS.

Nothing is more common than for the back of the horse to become chafed and raw from the unequal pressure of the saddle; and sometimes this condition continues until troublesome tumors are formed. After a time, these break, and discharge considerable quantities of matter. The same consequences may proceed from the severe pressure of other portions of the harness besides the saddle.

These injuries of the back have taken different names, according to the various phases which they assume, from the first chafing of the skin to the final ulceration of the tumor. Patches of skin, under the saddle, often appear dead and destitute of blood, and these are called "warbles." When they ulcerate and discharge pus, they are termed "sit-fasts." After the tumor has gone, the saddle is often replaced too soon, before the parts have entirely healed, and while there is yet considerable tenderness. The rubbing now occasions a hard, almost horny excrescence, and this has strangely received the name of "navel gall," in consequence of its location upon the back, opposite the navel.

So many names, for what is substantially the same trouble, tend to confusion, and are certainly altogether unnecessary. Saddle galls they all were in the beginning, and saddle galls they may be appropriately designated under all after developments.

TREATMENT.

The treatment will necessarily vary somewhat, according to the circumstances in which the horse, and the person using him, happen to be placed. If at home, the first and essential thing to do is to let the animal rest. Do not put a saddle on him until he is entirely well. In all stages of the complaint, use the corrosive liniment, which will readily heal the sore, in all cases, if the horse is exempt from service under the saddle. Continue to apply it daily, with a little mop, always drying it in well with a hot iron, until the cure is completed.

But it may be the traveler's misfortune, when far away from home, to find that the back of his horse has become badly galled with the saddle, and this in warm weather especially; or perhaps the skin of the back is scalded from the use of a woolen blanket, forming a worse sore than even saddle galls. At any rate, his horse is in no condition to bear the saddle; yet he must ride the poor creature, or else dispose of him at a sacrifice, and hurry forward by some other mode of conveyance. In such a predicament, the knowledge of some means, either to cure the sore back or to remove pressure from it, when the saddle is being worn, would be not merely of pecuniary benefit, but, to every humane person, it would prove a source of real pleasure.

Such means we can easily suggest. As soon as the condition of the back is discovered, wash the sore with clean, cold water, and, when dry, cover it entirely over with a piece of adhesive plaster. This must first be heated, of course, until the salve with which it is coated has been melted, and it must then be applied as quickly as possible, and pressed down with the hands. The best plan is to carry some live coals from the fire, or a hot iron, close to the horse, and there heat the plaster. If the back is greatly swollen, and matter has formed, cut a hole in the center of the plaster, before putting it on, so that the matter can escape readily.

Such a plaster will entirely prevent the friction of the saddle or blanket, while the salve upon it is very healing It also excludes the air, and is almost equivalent to a new piece of skin. Using it thus is emphatically patching the horse's back. Should the plaster come off, apply another immediately. If an ulcerated sore has formed, either a hole may be cut in the blanket, so as to relieve the part from pressure, or the blanket may be folded in such a manner as to lift the saddle from the sore entirely.

With this treatment, the horse may be ridden constantly, and the saddle gall will not only grow no worse, but will slowly heal. But it can be recommended only in the case we have supposed. When the horse can be at home, no saddle should be allowed to touch his back until it is quite well again.

INJURIES OF THE EAR.

Among the many cruelties practiced upon the horse is that of pinching and pulling the ears. If the animal is restless or fractious while shoeing, many blacksmiths have a fashion of taking hold of the ear with their pincers; and should he rebel against such usage, he is pulled by the ear with all the strength which the smith can exert, or that of some assistant who holds him while the shoe is being fastened. Other persons habitually pursue the same course when they wish to control a wild or fractious horse.

By such means the ear is often badly injured, and the tendons which sustain it in its erect position being broken, it drops down to one side. The horse no longer has any control over it, and it flaps about with every motion of the head and neck. Serious ulcers are sometimes the consequences of these lesions of the muscles and cartilages of the ear; and cases have occurred where the same causes produced a running sore, similar to poll-evil, on the upper side of the ear, near the head.

But these abuses occasionally result in still graver disorders. Ulcers have been formed in the cavities of the ear within

the head, especially from blows inflicted upon the latter at the origin of the ear. Some persons are so ill-tempered and furious that, if the horse does not obey the slightest intimations of their will, they rush for the nearest cudgel, and commence beating him over the head.

Permanent deafness is not unfrequently caused by such violence. There are many horses in this country either wholly or partially deaf in one or both ears. How common it is to find horses that seem never to hear any commands unless given in a very loud tone of voice, and then they start suddenly, as though only just conscious of having been spoken to. Sometimes the hearing is perfect upon one side, but on the other it is gone entirely.

TREATMENT.

If the trouble is all upon the outside, the treatment for fistula should be employed. If there is nothing more than a swelling or tumor just beginning, apply the corrosive liniment; but use the May-apple liniment when matter is already forming. Should there be an abscess on the outside, open it at its lower extremity, and let the lancet slant upward into the tumor.

In case the injury is within the cavities of the head, little can be done either to relieve or cure. Sometimes, however, relief can be given by ejecting into the ear, with a small syringe or pipe, a small quantity of the eye-wash, prepared as directed in Chapter XXIV. The case will assuredly prove a very obstinate one. A fatal termination is not impossible, while deafness is a very probable result.

SORE EARS.

Scabby or mangy eruptions sometimes make their appearance on the tips of the ear, and spread downward until that whole member is covered with them. These constitute a genuine skin disease, resembling several other cutaneous eruptions described more fully in the preceding sections of this chapter.

TREATMENT.

Make some good strong soap-suds, with which wash off the ear, and then anoint with the sulphur ointment. Give this a thorough trial, and if a cure is not effected, apply a very little of the mercurial salve once a day, for two or three days. Omit for about the same period, and apply again. But it will rarely be necessary to use this salve.

VERMIN.

This is a very appropriate connection in which to introduce the subject of vermin, those pests which, in some form or other, torment every class of the animal creation. Heretofore, vermin have generally been supposed to infest only the horse which was very poor and in bad plight generally; but during and since the late war, we have known them to trouble a great many animals in excellent condition. In such cases they have probably been only the offspring of chance comers, originally bred elsewhere.

On poor, mangy horses, these pests do undoubtedly breed. They are one of the curses which attend bad stabling, foul air, filth, and negligence. Although they may appear on horses that run in pasture, in nine cases out of ten they are bred in illy-managed stables, and are almost invariably the associates of impurities and squalid poverty. They always evidence a lack of proper currying, and negligence in respect to keeping both the horse and stable clean.

They are generally worse in the early spring, just before the hair is shed; but, unless removed, they often cling to many old carcasses all the year. Old horses are more troubled with them than the young and vigorous. They are the torment especially of the colt, during his first winter, and many a poor, thin, half-dead yearling has been reduced to that condition by these crawling nuisances. To their presence the farmer may often trace the lean unthrifty condition of his colt, that is otherwise inexplicable.

In some cases they are the offspring of disease, and too

commonly are the cause of it; for no animal can long remain healthy while thus infested. Surfeit, mange, and hide-bound, and perhaps some other affections, are always aggravated by them.

TREATMENT.

If the horse has no chronic or seated disease, vermin may be destroyed by simply greasing the hair with the mercurial salve, or the precipitate or sulphur ointment. Tobacco will kill them, but it will come too near killing the horse also, to be a desirable remedy.

In connection with whatever ointment may be used, the horse should be well dosed with sulphur and resin. Three table-spoonfuls of sulphur and one of finely-pulverized resin may be given in the feed every other day.

A change from the stable to the pasture will be the best medicine after this; but if this can not be afforded the horse, let him have a diet abundant, wholesome, and relaxing.

In all skin affections, where alteratives are needed, the preparation mentioned in Section VII, of Chapter XXIV, may be used with advantage. It will do as a substitute for the sulphur and resin, in some cases, and still oftener, perhaps, in connection with them.

CHAPTER IX.

DISEASES OF THE BRAIN AND NERVOUS SYSTEM.

The brain and nervous system of the horse, like those of the human being, are subject to a variety of disorders; but in this country much less frequently, we are led to believe, than in Europe. Some of these diseases result from injuries; others are due to local derangement in the cerebral region itself; and a third class proceed from a disturbed condition of the nervous system generally. Injuries of the brain nearly always terminate in death.

In a large majority of cases, where the brain of the horse is affected, compression is a principal cause, or, at least, the very marked accompaniment, of disease. Compression of the brain may be of three kinds—of the bones, of water, and of blood. Bony enlargements occasionally form upon the inner surface of the cranial bones, and, pressing inwardly upon the brain, produce spasms and death. Similar effects are sometimes caused by brutal or heedless blows upon the head, especially that of the colt, in whom the bones are yet soft and flexible.

WATER ON THE BRAIN.

This constitutes the watery compression. It is the collection of a viscid fluid between the membranes or the ventricles and passages of the brain. In the mature horse this affection occurs but seldom, but it is a not uncommon ailment of young colts. It nearly always produces deformity, and usually considerable enlargement of the head. The colt generally dies at the time of foaling, or soon afterward, but in some cases lingers along for some months.

We know of no remedy for water on the brain. Occasionally, the forces of Nature may prove sufficient to overcome

the difficulty, but this is more than the owner ever has any right to calculate upon.

APOPLEXY.

Apoplexy is caused by the pressure of blood upon the brain, and is common in the human subject. It is rarely recognized in the veterinary practice of the farmer, and he would probably be surprised to know how many horses die of it yearly. The animal's death is usually attributed to some other disease, and the treatment pursued, being in accordance with the erroneous diagnosis, in nine cases out of ten, aids materially in hastening a fatal result. Perhaps nearly one fourth of those severe attacks of disease which go among the masses by the name of bots, is really apoplexy; and we venture the opinion that in the Northern States, as well as in Europe and other grass-growing countries, the disorder which the schools, the veterinary practitioner, and the farmer all alike call staggers is, in a very large majority of instances, no other than the same disease. As we have elsewhere stated, that awful scourge of the Southern States, blind staggers, is not known north of about the latitude of thirty-six.

Apoplexy does not often attack any other than the horse in very plethoric condition. Sometimes it may result from other diseases; and the animal which has been greatly overtasked and reduced in flesh, and then kept for a time with nothing to do, and an abundance of high feed, will undoubtedly be a proper subject for it. Young colts, while teething, are rather apt to be troubled with it also. But, after all, plethora, with its usual accompaniments of high feeding and limited exercise, constitutes by far the most frequent cause of apoplexy.

Happily, notions now prevail very different from those which formerly obtained, in relation to the condition of flesh most conducive to the horse's beauty, utility, and health. It is not now esteemed desirable that the animal should be made fat enough for the butcher, nor that it is even safe to keep him housed up nearly all the time without exercise.

Apoplexy is always characterized by giddiness and wildness of motion, and nearly always by a staggering gait. Hence, the reason why it is so frequently mistaken for staggers. Its severe symptoms, in the next stage, are profuse sweating; a trembling of the whole frame, and especially of the knees; a wild, wistful look, and a twitching of the skin and jerking of the ears. The majority of farmers, and half the modern horse doctors, would pronounce these symptoms indicative of bots, and would fill the poor creature's stomach with quantities of nauseous drugs, for the purpose of making the bot "let go his hold," but which only increases the suffering, if indeed they do not actually cause death.

All this is sheer nonsense. The horse needs no medicine; the condition of his system precludes their use at this stage. His suffering proceeds from a nervous agitation; for the whole system of nerves is dreadfully disturbed, and the brain—the great sensorium of nervous power—is fearfully compressed. There has been a great and sudden determination of blood to the head. The whole cerebral tissue of nerves and blood-vessels has become terribly congested. The brain, first benumbed by the compression of the engorged vessels, is next paralyzed, and its functions are suspended, and then the final external symptoms of the disease are loss of sensation and voluntary motion.

The cause of this flow of blood to the head, is not a changed or a diseased condition of the brain itself. General contraction of the vascular system has forced undue qantities of blood into its large receptacles; or it may be that violent external pressure, such as that of a tightly-fitting collar, has impeded the return of the blood from the brain to the heart. The accumulation of fat, or an excessive growth of flesh throughout the body, along the channels of the blood-vessels, is apt to produce such a contraction of their walls, while, in addition to this, it is always accompanied by a great fullness of blood. For these reasons, it is dangerous to overfeed and pamper any animal.

Not only is there too much blood, but it is too thick, and

of an unnaturally deep red, almost brown color. By the contraction of the vessels, this turbid blood is thrown back upon the heart in larger quantities than that organ can dispose of it. The heart becomes full, and can contain no more; the blood returning from the brain can not move forward; the jugular vein at the side of the neck is swollen to its utmost capacity; the vessels of the brain, dreadfully distended, press violently upon its soft substance; the blood is stilled; nervous action is suspended, and the horse falls down in death.

All this may not consume more time than we have occupied in telling it, but sometimes it is the work of hours. The condition that has induced the attack may have been developing for months or years. One who feeds his horse very high, until the animal is very fat, and, meanwhile, allowed but little exercise, need not be surprised, on going to the stable some morning, to find his favorite dead or dying from apoplexy.

The attack comes on without much warning, sometimes with none at all. When the farmer's "bots" or "staggers" takes on the features described above, the case is a grave one.

One effect of this disease merits particular notice, and this is the extent to which the eyes often suffer, even when the apoplectic symptoms have been comparatively mild. Not a few cases of eye diseases, and some of actual blindness, have their origin in attacks of apoplexy. Says Youatt: "It is not the common blindness from cataract, but a peculiarly glassy appearance of the eye. If the history of these blind horses could be told, it would be found that they had been subject to fits of drooping and dullness, and these produced by absurd management respecting labor and food."

The symptoms and developments of apoplexy we have already described, in great measure; but Youatt's treatment of the same subject is so full and satisfactory, that we can not forego the pleasure of spreading the passages before our readers:

"The horse is a little off his feed; he is more than usually dull; there is a degree of stupidity about him, and, generally, a somewhat staggering gait. This goes off when he has been out a little while, but it soon returns under a more decided character, until, at length, it forces itself on the attention of the most careless.

"The actual illness is perhaps first recognized by the horse standing with his head depressed. It bears upon, or is forced against the manger or the wall, and a considerable part of the weight of the animal is evidently supported by this pressure of the head. As he thus stands, he is balancing himself from one side to the other, as if he were ready to fall; and it is often dangerous to stand near to him, or to move him, for he falls without warning. If he can get his muzzle into a corner, he will sometimes continue there motionless for a considerable time, and then drop as if he were shot; but, the next moment, he is up again, with his feet almost in the rack. He sleeps, or seems to do so, as he stands, or at least he is nearly or quite unconscious of surrounding objects. When he is roused, he looks vacantly around him. Perhaps he will take a lock of hay, if it is offered to him; but, ere it is half masticated, the eye closes, and he sleeps again, with the food in his mouth. Soon afterward he is, perhaps, roused once more. The eye opens, but it has an unmeaning glare. The hand is moved before him, but the eye closes not; he is spoken to, but he hears not. The last act of voluntary motion which he will attempt is usually to drink; but he has little power over the muscles of deglutition, and the fluid returns through the nostrils.

"He now begins to foam at the mouth. His breathing is laborious and loud. It is performed by the influence of the organic nerves, and those of animal life no longer lend their aid. The pulse is slow and oppressed; the jugular vein is distended almost to bursting; the muzzle is cold, and the discharge of the fæces involuntary; he grinds his teeth; twitchings steal over his face and attack his limbs—they sometimes proceed to convulsions, and dreadful ones, too, in

which the horse beats himself about in a terrible manner—but there is rarely disposition to do mischief. In the greater number of cases, these convulsions last not long. All the powers of life are oppressed, and death speedily closes the scene.

"On examination after death, the whole venous system is usually found in a state of congestion, and the vessels of the brain are peculiarly turgid with black blood. Occasionally, however, there is no inflammation of the brain or its membranes; but either the stomach contains a more than usual quantity of food, or the larger intestines are loaded with foul matter."

TREATMENT.

The treatment indicated by the symptoms of apoplexy is very plain. The stomach itself needs no medicine, but may be made the medium through which to convey a remedy for the benefit of the nervous system. As it is the superabundance of blood in the region of the brain that is killing the horse, the first step in the treatment will be to bleed. Open the jugular vein as soon as possible, and let the blood run until its color changes to a light red color. The incision, whether made with the fleam or lancet, should be large, so that the stream may be of corresponding size, and flow freely. Reaction is to be produced, and the blood drawn from the vicinity of the brain as rapidly as possible. The operator must be the judge as to the precise amount of blood to be taken, as this will vary greatly in different cases; but his rule should be to let it flow until the horse falters or trembles, or begins to blow.

Next, give a pint of hot salt and water, with a tea-spoonful of Cayenne pepper and half an ounce of laudanum in it. Youatt prescribes gentian and ginger. These are very good, but quite mild, and, in our practice, have not seemed to fully meet the requirements of the case. They do pretty well, however, to follow after the laudanum. Prepare in proportions as follows: One-half ounce of pulverized gentian, the

same of ginger, and four ounces of Epsom salts. These quantities constitute two doses. Give the first dose four hours after the laudanum, and the other twelve hours later. An opiate is needed, as well as a powerful sedative and antispasmodic. All these are contained in the remedies here recommended. The salt and water nauseate, the pepper stimulates, the laudanum is the opiate, and all are antiseptic.

As soon as the horse becomes somewhat easy and still, the aloes pill should be given—from one-half an ounce to an ounce of aloes, made into a pill with some flour. Put this upon the roots of the patient's tongue, and he will swallow it.

But little more is needed. If the case can be carried thus far successfully, a recovery may reasonably be looked for. A judicious care must be exercised in regard to diet. Light food only must be allowed—mashes, green substances, and pasture. Horses that are regularly permitted to graze are not troubled with apoplexy. It is a disease of the stables.

After recovery, do not suffer the horse to become full and plethoric again, or the attack will be almost certain to return. A horse that has once had apoplexy is more subject to it ever afterward. The tendency will probable be to take on flesh and fat, but this must be carefully guarded against. Strong, rich food may bring on another attack in a few days.

RABIES (HYDROPHOBIA, OR MADNESS).

Of this awful disease we know nothing, except from the descriptions given of it in books. Among horses it is of rare occurrence, indeed, in America; and we are persuaded it never has any origin independent of the bite of a mad dog. But even mad dogs are scarce animals; for, although they may occasionally be found in cities, the country is very seldom troubled with them. In our extended travels through twenty-two States of the Union, we never encountered a mad dog, nor so much as heard of more than a few authenticated cases.

English writers say that it is dangerous to leave a dog in the stable with the horse, lest he should go mad and bite the latter. No such fears are ever entertained in our favored land, nor is there the least need that there should be.

We rejoice to speak of this as so nearly a foreign disease only, for all veterinarians concur in pronouncing it incurable.

FITS, OR EPILEPSY.

Though seldom met with, epilepsy is not unknown in the United States. The horse suffering from fits approaches nearly to a condition of frenzy. He has a wild, fierce look, rears and pitches about, and is generally unmanageable from the very beginning of the attack. As the disease progresses, nervous tremblings seize him, and, at last, he falls down in utter stupor or fearful convulsions. The duration of these fits varies, in different cases, from a few minutes to a considerable length of time.

After awhile the stupor passes away, or the convulsions cease. The horse gets up, shakes himself, as though nothing serious had happened, moves off, and goes to eating.

As to a cure, it is doubtful whether one has ever been effected in a case of genuine epilepsy. Some authors bid the farmer set to work and discover the cause, and then timidly bid him hope for a cure. But we have yet to learn of such a discovery ever being made with any satisfactory degree of certainty. A horse that is subject to fits must be regarded as a dangerous possession, and the farmer will consult his own interest and the safety of his family by putting the poor creature beyond all opportunity of doing mischief.

INFLAMMATION OF THE BRAIN, OR PHRENITIS.

This disease, though by no means a common one in this country, is encountered more frequently than epilepsy. It is of two kinds, or, rather, it may originate from two sources: first, from the brain itself, in which case it is called spontaneous inflammation; and, secondly, from some other disease, when it is described as symptomatic.

The latter forms the only development of the disease with which we are practically acquainted. It is this which is the final cause of death in all fatal cases of the genuine blind staggers of the South. Occasionally apoplexy is attended by it, and acute rheumatism often produces slight cerebral inflammation.

A case of spontaneous inflammation or fever of the brain we never saw. This form of the disease may occur in this country, but it is certainly very unfrequent. It can not be far wrong to characterize this as a European malady, and here again let the Englishman* tell his own story:

"Primary inflammation of the brain or its membranes, or both, sometimes occurs, and of the membranes oftenest when both are not involved.

"Whatever be the origin of phrenitis, its early symptoms are scarcely different from those of apoplexy. The horse is drowsy—stupid; his eye closes; he sleeps while he is in the act of eating, and dozes until he falls. The pulse is slow and creeping, and the breathing oppressed and laborious. This is the description of apoplexy. The symptoms may differ a little in intensity and continuance, but not much in kind.

"The phrenitic horse, however, is not so perfectly comatose as another that labors under apoplexy. The eye will respond a little to the action of light, and the animal is somewhat more manageable, or, at least, more susceptible, for he will shrink when he is struck, while the other frequently cares not for the whip.

"In the duration of the early symptoms there is some difference. If the apoplexy proceeds from distension of the stomach, twenty-four or thirty-six hours will scarcely pass without the cure being completed, or the stomach ruptured, or the horse destroyed. If it proceeds more from oppression of the digestive organs than from absolute distension of the stomach, and from that sympathy which subsists between the

*Youatt: American edition, p. 98.

stomach and the brain, the disease will go on—it will become worse and worse every hour, and this imperfect comatose state will remain during two or three days. The apoplexy of the phrenitic horse will often run its course in a few hours.

"In a case of evident phrenitis, blood-letting and physic must be early carried to their full extent. The horse will often be materially relieved, and, perhaps, cured, by this decisive treatment; but, if the golden hour has been suffered to pass, or if remedial measures have become ineffectual, the scene all at once changes, and the most violent reaction succeeds. The eye brightens—strangely so; the membrane of the eye becomes suddenly reddened, and forms a frightful contrast with the transparency of the cornea; the pupil is dilated to the utmost; the nostril, before scarcely moving, expands and quivers, and labors; the respiration becomes short and quick; the ears are erect, or bent forward to catch the slightest sound; and the horse, becoming more irritable every instant, trembles at the slightest motion. The irritability of the patient increases—it may be said to change to ferocity—but the animal has no aim or object in what he does. He dashes himself violently about, plunges in every direction, rears on his hind legs, whirls round and round, and then falls backward with dreadful force. He lies for awhile exhausted; there is a remission of the symptoms, but perhaps only for a minute or two, or possibly for a quarter of an hour. * * *

"The second attack is more dreadful than the first. Again the animal whirls round and round, and plunges and falls. He seizes his clothing and rends it in pieces; perhaps, destitute of feeling and of consciousness, he bites and tears himself. He darts furiously at every thing within his reach; but no mind, no design, seems to mingle with or govern his fury.

"Another and another remission and a return of the exacerbation follow, and then, wearied out, he becomes quiet; but it is not the quietness of returning reason, it is mere

stupor. This continues for an uncertain period, and then he begins to struggle again; but he is, probably, unable to rise. He pants, he foams; at length, completely exhausted, he dies.

"There are but two diseases with which phrenitis can be confounded, and they are cholic and rabies. In cholic, the horse rises and falls; he rolls about and kicks at his belly; but his struggles are tame compared with those of the phrenitic horse. There is no involuntary spasm of any of the limbs; the animal is perfectly sensible, and, looking piteously at his flanks, seems designedly to indicate the seat of pain. The beautiful yet fearfully-excited countenance of the one, and the piteous, anxious gaze of the other, are sufficiently distinct; and, if it can be got at, the rapid, bounding pulse of the one, and that of the other scarcely losing its natural character in the early stage, can not be mistaken.

"In rabies, when it does assume the ferocious form, there is even more violence than in phrenitis; but there is method, and treachery, too, in that violence. There is the desire of mischief for its own sake, and there is frequently the artful stratagem to allure the victim within the reach of destruction. There is not a motion of which the rabid horse is not conscious, nor a person whom he does not recognize; but he labors under one all-absorbing feeling—the intense longing to devastate and destroy."

PALSY.

A case of primary palsy we have not been called upon to treat in a practice of twenty years. The few cases of palsy which have come under our own observation have invariably been produced by other diseases, and always shared their fate. If the horse recovered from the other attack, the palsy passed away, but never otherwise.

Palsy is occasioned by the suspension or the cessation of nervous action. In the horse, it is generally considered to be the result of some injury of the spinal cord, in consequence of which the hips and thighs, and other parts of the hind extremities, become partially paralyzed.

TREATMENT.

This would seem to be plainly indicated by the nature of the disease. Bleed two or three times, at intervals of ten days, drawing a gallon of blood the first time, and half as much at each successive bleeding. Physic actively. Give half an ounce of aloes in a pill, and, after a reasonable interval, follow this up with one-fourth of a pound of Epsom salts.

Now apply the magic nerve liniment, twice a day, to the back, near the junction of the hips with the spine. If this seems insufficient, substitute a daily application of the corrosive liniment for two or three days.

If the weather is cold, cover the horse with a good, warm blanket, so as to protect him from it as much as possible. Nothing should be given as food but the lightest and most relaxing diet, provided it does not produce dysentery. Strong or heating food will be nearly certain to result in killing the horse.

INSANITY.

John Bull's horses, like his dogs, appear not only to suffer from affections of the brain to a much greater extent than do ours, but also to exhibit, now and then, the most singular and sometimes highly diverting idiosyncrasies. For any reputable American author to descant upon the horse's insanity would lead most of his readers to question whether his own mental condition was much better; but, as a curious and entertaining episode in the history of veterinary science in other lands, we are tempted to close this chapter by drawing upon the already much-quoted pages of Youatt for the following anecdotes, which that distinguished writer introduces, by way of illustration, in his remarks upon "Insanity:"

"A horse, seven years old, was remarkable for an habitual air of stupidity, and a peculiar wandering expression of countenance. When he saw any thing that he had not been accustomed to, or heard any sudden or unusual noise, whether it

was near or at a distance, or sometimes when his corn was thrown into the manger without the precaution of speaking to him or patting him, he was frightened to an almost incredible degree; he recoiled precipitately, every limb trembled, and he struggled violently to escape. After several useless efforts to get away, he would work himself into the highest degree of rage, so that it was dangerous to approach him. This state of excitement was followed by dreadful convulsions, which did not cease until he had broken his halter, or otherwise detached himself from his trammels. He would then become calm, and suffer himself to be led back to his stall; nor would any thing more be seen than an almost continual inquietude, and a wandering and stupid expression of countenance. He had belonged to a brutal soldier, who had beaten him shamefully, and before which time he had been perfectly quiet and tractable.

"A Piedmontese officer possessed a beautiful and, in other respects, serviceable mare, but which one peculiarity rendered exceedingly dangerous—that was a decided aversion to paper, which she recognized the moment she saw it, and even in the dark if two leaves were rubbed together. The effect produced by the sight or sound of it was so prompt and violent that she several times unhorsed her rider. She had not the slightest fear of objects that would terrify most horses. She regarded not the music of the band, the whistling of the balls, the roaring of the cannon, the fire of the bivouacs, or the glittering of arms. The confusion and noise of an engagement made no impression on her; the sight of no other white object affected her. No other sound was regarded, but the view or the rustling of paper roused her to madness.

"A mare was perfectly manageable and betrayed no antipathy to the human being, nor to other animals, nor to horses, except they were of a light-gray color; but the moment she saw a gray horse, she rushed toward it, and attacked it with the greatest fury. It was the same at all times, and every-where. She was all that could be wished on the

parade, on the rout, in the ranks, in action, and in the stable; but if she once caught a glimpse of a gray or white horse, she rested not until she had thrown her rider or broken her halter, and then she rushed on her imagined foe with the greatest fury. She generally contrived to seize the animal by the head or throat, and held him so fast that she would suffocate him, if he were not promptly released from her bite.

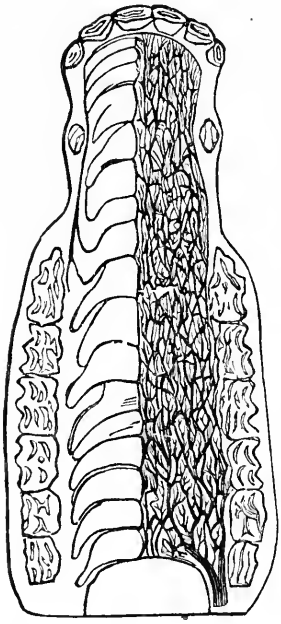
"Another mare exhibited no terror except of white, inanimate objects, as white mantles or coats, and particularly white plumes. She would fly from them if she could; but if she was unable to accomplish this, she would rush furiously upon them, strike at them with her fore-feet, and tear them with her teeth.

"These instances are selected from various others, because they approach so nearly to what would be termed insanity in the human being. It is confined to one object—it is a species of monomania, and as decided insanity as ever the biped discovered. One of these horses, the second, was, by long and kind attention, divested of this insane terror, and became perfectly quiet and useful; but the other three bid defiance to all means of cure, and to coercion among the rest."

CHAPTER X.

DISEASES OF THE TEETH AND MOUTH.

THE cut represents the palate and the teeth of the upper jaw of the mature horse. It shows the six incisors, or *nippers;* the two canine teeth, or *tushes*—sometimes called *bridle-teeth;* and the twelve molars, or *grinders.* Upon one side of the roof of the mouth is a natural view of the bars of the palate, and upon the other is indicated the appearance which would be presented if the bars were dissected off so as to reveal the intricate net-work of blood-vessels and nerves below.



Careful observation has convinced us that the teeth of the horse are much oftener the source of suffering and disease than is generally believed. In speaking of this subject, Youatt says: "Horsemen, in general, think too lightly of dentition [teething], and they scarcely dream of the animal suffering to any considerable degree, or absolute illness being produced; yet he who has to do with young horses will occasionally discover a considerable degree of febrile affection, which he can refer to this cause alone. Fever, cough, catarrhal affections generally, disease of the eyes, cutaneous affections, diarrhea, dysentery, loss of appe-

tite, and general derangement will frequently be traced by the careful observer to irritation from teething.

"It is a rule, scarcely admitting of the slightest deviation, that, when young horses are laboring under any febrile affection, the mouth should be examined, and if the tushes are prominent and pushing against the gums, a crucial incision [that is, one in the form of a cross] should be made across them. 'In this way,' says Mr. Percivall, 'I have seen catarrhal and bronchial inflammations abated, coughs relieved, lymphatic and other glandular tumors about the head reduced, cutaneous eruptions got rid of, deranged bowels restored to order, appetite returned, and lost condition repaired.'"

Possibly the effect which this extract is calculated to produce is hardly distinguishable from that of an over-statement, and yet few experienced veterinary practitioners would undertake to dispute the general correctness of these views.

The colt cuts his first front teeth when very young, which operation is called *teething*. After this, at different stages of his growth, these are displaced by a new set, larger and better adapted to the needs of the mature horse. For the sake of convenience, this process is distinguished by the name of *shedding*.

The horse has, or should have, when fully grown, forty teeth—in each jaw, six nippers, two tushes, and twelve grinders. In the mare, the tushes are either not developed at all, or else do not make their appearance before old age, although bony protuberances, corresponding to them, are hidden below the gums. The tush is a long, sharp tooth, occupying a position on each side of the jaw, between the nippers and grinders, but somewhat nearer the former than to the back teeth. What a great many farmers call *blind teeth*, and ignorantly imagine to be the cause of almost numberless ills, come on the lower jaw between the bridle-teeth and grinders.

The changes which the teeth undergo before attaining their full development, with the derangements which attend these changes, will first claim our attention.

TEETHING, OR DENTITION.

When the foal is born into the world, no teeth are visible except the first and second grinders, on each side, above and below, making eight in all; or sometimes these do not appear for two or three days afterward. He cuts the remaining teeth in succession, at various intervals; so that the *milk teeth*—the first set—are not all developed until he is in his third year.

It is not our purpose, in this connection, to describe the methods of telling the age of a horse by his teeth, that subject being reserved for Chapter XIX. The diseases of the teeth and mouth form what we have now to consider.

The cutting of nearly thirty teeth, however lightly it may be regarded by the stock-raiser, is certainly a matter of no small moment to the colt. While it is true that Nature prepares the gums, in a great measure, for this process, if any one will take the trouble to examine the mouth and gums of the colt while it is going on, he will probably be astonished to find how hot and feverish these parts are. During the period of suckling, the milk of the mother tends greatly to counteract the evil effects of teething, and, at this period, Nature will seldom need any assistance in the way of other diet, or medication of any kind. But, after weaning, all through what remains of teething, and the entire process of shedding, the young animal does not fare so well, and a variety of disorders lie in wait for him, making this the most critical period of his whole life.

It is undoubtedly a wise and kindly provision of Nature that the colt's teeth do not all come at once; for, if that were the case, such would be the severity of the operation that very few, probably, would live through it. As it is, the soreness and inflammation occasioned by the cutting of one pair has time to subside, and the gums are allowed time to heal over before any more come through. It is worthy of remark, also, that dentition does not so seriously affect the horse as either the human species or the dog.

The colt's nippers are not set in the jaw-bones, as a great many suppose they are, but rest upon them in a sort of saddle-fashion, and are attached to the jaw by a bony adhesion, having a small, shallow socket, but no appearance of fangs or roots, like the permanent teeth. This setting, however, is sufficiently firm for all the purposes that Nature intended the colt to use the teeth for, embracing scarcely any thing more than the procuring of such food as grass, hay, oats, and other provender easily masticated. But hard food, such as corn, especially when it is fed in the ear, does very materially injure his teeth. The great strain to which its mastication subjects them is exceedingly liable to produce soreness and inflammation that, in turn, often become the exciting causes of other forms of disease, especially of those whose seat is in the head.

SHEDDING.

Closely connected with teething, and, in the beginning, coincident with the latter stages of that operation, is the process of shedding, which is the replacement of the milk by the permanent teeth. The first set of teeth do not come out, and the lacerated gums then heal over, as is the case with children, but the second tooth comes up immediately under the first one, and lifts it entirely out of the gums. What is still more remarkable, while this is going on, the under part of the milk tooth is being gradually ground or worn off, and its substance absorbed by the surrounding parts, so that there is but a small portion of it left by the time the permanent tooth reaches the top of the gums. As the under tooth comes up from its bed in the jaw, the gums, being lifted up with it, retain their hold upon the other until the second is near enough through to subserve the needs of the animal in eating; then, all at once, the gums peel off from the upper tooth, which drops out, and they now sink down around the new one; their swelling and soreness subside, and all is right in the mouth again.

For a considerable time previous to their removal, the po-

sition of the milk teeth is by no means a firm one, as they are only retained in their places by the adhesion of the gums. Every hard substance that comes in contact with them is likely to move or twist them about.

Soreness and inflammation almost invariably accompany shedding. Perhaps there is no time, until this operation is over, that the mouth and gums are wholly free from fever and swelling. The bad condition of many young colts, following loss of flesh and appetite, may be traced to these circumstances. It is easy to test the matter by examining the parts. Nor is the loss of appetite the only or chief difficulty in such cases. The character of the saliva undergoes an injurious change from the feverish influences of the mouth and gums, and, being carried to the stomach in this condition, it naturally produces derangement of the digestive process. No doubt many a serious disease of the mature horse originated at this period of his life, and is largely attributable to the effects of shedding.

TREATMENT.

Not much either can or should be done in the way of medication while the colt is teething and shedding. The great consideration is his diet, and to this too much attention can not well be paid. Keep away from him solid and heating food, and let him have only such a moist, light diet as can easily be supplied him in winter, by provender, cut feed, and small quantites of oats; while for the summer season, pasture is not only the most readily procurable food, but is immeasurably the best.

In the cotton States, where pastures are poor and scanty, it is almost impossible to raise a colt by any ordinary degree of care. There the young creatures are generally fed on corn, and on corn fodder, which is still worse, and the large majority of them become diseased and die. They are not unfrequently troubled with big head, though such is the vigor of the system at this age that they withstand its attacks much better than old horses. Green grass we consider

essential to the health and natural power of the horse of all ages.

Salting is another important matter. Salt is medicine to the horse, and to the colt especially. If fed in a trough or manger, give the unthrifty colt some sulphur, from time to time. It will aid much to restore health and condition. Before this, however, it will have been well to examine his mouth, and, if there is marked heat and soreness about the gums, it is pretty surely an indication of teething. Two incisions, at right angles, made by drawing a sharp knife across the gum, just above the tooth, will give great relief.

The very frequent belching of wind, which may be noticed in some horses and colts, betrays a very common source of annoyance and suffering. This is a sour stomach. Perhaps the teething colt is, most of all, subject to it, caused by the action of the changed saliva, which is continually flowing from the feverish mouth into the stomach. Fermentation of the food is one of the evil effects of this action. To correct this, it is desirable that some good wood ashes be kept in the animal's trough with his oats. In a majority of cases, their alkaline properties would entirely neutralize the acid condition of the stomach, in the same manner as the milk of the mother does this for the colt before he is weaned.

BLIND TEETH.

Blind teeth are still, to many uninformed persons, the source of an anxiety amounting almost to terror. Yet they seldom do any material injury, and never in the way that they are supposed to do. It is not probable that they are ever the real cause of any kind of disease. Some farmers imagine that they bring on the peculiar enlargement of big head, especially in the colt; and if the eyes are at all suspected, the first thing done is to look for blind teeth, and the next to knock them out. Many a blind tooth has the writer removed at the imperative bidding of credulous owners, whom no amount of argument could satisfy that such an

operation was not at all necessary to "stop the big head," or "save the eyes."

True, they are often in the way, and never of the least service, and, for these reasons, it is best to extract them. But there is no ground for supposing them instrumental in developing other diseases, any further than they may excite local irritation and soreness in cutting, although this effect is less marked in their case than in that of the other teeth.

Mares do not have them, unless a peculiar growth of the jaw-bone, which is occasionally seen at the point where they usually come through, can be called such. Neither do a great many horses. In most instances, the appearance is rather that of a bony enlargement on the top of the jaw-bone than that of a real tooth, and the gum is frequently not cut through at all. Blind teeth seem to have no socket, fang, or nerve, and are to be regarded as intruders only.

DECAY OF THE TEETH.

The teeth of horses, like those of human beings, are subject to decay. In common parlance, they become rotten, which is just the same condition that the dentist refers to when he speaks of "caries" of the teeth. The horse's front teeth sometimes show signs of decay, but generally it is the jaw teeth, the molars, which are affected.

It may be a novel idea to many farmers, and, perhaps, still more so to the charming portion of creation represented by their wives and daughters, but it is a fact that the horse not unfrequently suffers from toothache. This is one of the causes which so often make him suddenly drop the corn, or other hard feed, from his mouth while eating. The owner or attendant generally sets this down as indicating some natural disrelish for the food at that particular time, whereas the fact very often is, that he has hurt his tooth. Having no hand to press to his mouth, the poor animal is allowed to suffer without there being so much as a suspicion of what the trouble really is.

A disordered condition of the stomach has much to do with

the premature decay of the teeth. The foul gases which it gives off, when there is fermentation of the food, exert a very detrimental effect upon the teeth. Similar consequences follow the reprehensible practice of giving the horse strong mineral poisons, such as copperas, blue stone, calomel, corrosive sublimate, arsenic, and many others. These have a tendency to destroy the enamel, and corrode and ruin the teeth.

TREATMENT.

We know of nothing to be done in the case of a decayed tooth except to extract it. This should be done, if at all practicable. Have made a pair of pullers on the principle of the keyed instrument used in dentistry, but larger and stronger, of course; and while an assistant holds open the horse's mouth, the operator can fasten on the decayed tooth and draw it. If the horse is vicious or restless, it will be necessary to fasten his head, so that he can not move it about. The operator may stand on a bench or box, so as to work to better advantage.

The horse's teeth should not be extracted except in extreme cases, when the fact admits of no doubt that they are the occasion of acute suffering. The practice of driving out the teeth with a punch or hammer ought not to be countenanced, and is only justifiable in those rare instances where a proper instrument can not be procured.

As one of the causes of decay, the condition of the stomach should receive careful attention. A hot, fetid breath, the tongue of a whitish-purple color, the saliva of the mouth thick and stringy—these are the indications of derangement of the digestive functions. The proper remedies now will be sulphur and "jimson" seed. Of the former, give four ounces every other day; of the latter, one ounce every third day. Four doses of each, at the intervals here prescribed, will be sufficient. Pulverized yellow poplar bark, or green limbs from the tree, may be used for the same purpose, and in the same manner as will shortly be directed for scurvy of the teeth.

SCURVY OF THE TEETH.

The teeth of old horses, in most cases the front teeth only, sometimes become covered with ridges of white scurf, or calcarious, limy deposits, which extend downward to the gums and keep them continually sore and inflamed. The trouble is not wholly incident to old age, for it sometimes affects young horses also.

Its causes, in nearly all cases, are very similar to those of decay. In fact, scurvy of the teeth is only one form which their decay assumes, the deposits of the decayed tooth remaining upon its surface. In the fermentation of the food, that so often follows high feeding and other causes of deranged digestive action, carbonic acid gas is generated in considerable quantities, and is belched up from the stomach. The teeth are mainly composed of the phosphate of lime, and when this gas unites with the lime which they contain, there results a scaly incrustation of carbonate of lime.

Mineral poisons constitute a powerful agent in producing scurvy of the teeth, no less than other forms of decay.

TREATMENT.

The first and most important part of the treatment consists in the regulation of so much of the digestive process as is conducted in the stomach, whose sourness must be promptly corrected. Sulphur and "jimson" seed will admirably serve this purpose, as indicated in the last section. The former acts as a mild alterative, and is the best regulator of the horse's system that we know of.

Good wood ashes should be kept in the manger. Yellow poplar bark, well pulverized, will prove an excellent adjunct in this part of the treatment. If kept constantly in the place where the horse feeds, he will eat considerable quantities of it from time to time. In some of the Southern States, it is customary to put long poles of green poplar in the stable, in front of the horse, and in a little while he has the bark eaten off them entirely. The bark of the poplar is a most

excellent tonic, and he is quite fond of it when green. Instinct teaches the horse a hundred things which man discovers only after laborious investigation, experiment, and reasoning. When diseased, if he is permitted to run where there are an abundance of bushes, he may very frequently be seen nibbling away at such of them as possess medicinal qualities, and especially those which act as tonics and astringents.

It will do no good to apply any thing to the teeth until the stomach is in proper condition; but this end having been secured, it will be quite in order to remove their calcarious deposits. This can be effectually done with a brush and a mixture of tartaric acid with fine salt. The use of the latter is to prevent the injurious effects of the acid upon the teeth, in a measure. Some ashes, or a weak lye made from them, may be used after this mixture, to still further counteract the acid. But we must here record our emphatic objections to the employment of any acids or caustics about the teeth. Their effects can not be wholly neutralized, and thus, while they may remove one difficulty, they are sure to bring on another.

Some persons are in the habit of filing the teeth that are affected with scurvy, and this is an operation which may be performed with decided benefit. After the incrustation has been removed with the file, the teeth will present a rough, jagged, appearance, and are in fine condition to favor the accumulation of more deposits. This may be remedied by using a second and much smaller file, or a piece of coarse sand-paper, followed by a piece of fine sand-paper. The beautiful enamel which disease has destroyed no art can replace; but the surface can be given a smooth polish that will be of great service, as a substitute for it, in resisting the effects of wear and decay.

The process is a simple and easy one. It requires a twitch on the horse's nose, and one man to hold it and turn the lip down, while the operator, with a file, broken off at the end, scrapes off the incrustations from the teeth, and, after

polishing them with sand-paper, oils them with a little sweet oil. This includes all that is to be done.

We have devoted more space to these branches of our subject than, at first, it was our intention to do. To this we have been impelled by the considerations that the general health of the horse is so intimately connected with the condition of the teeth, and that so little account is commonly taken of this fact by horsemen. Especially are they apt to overlook the injuries sometimes sustained by the colt from the operations of teething and shedding. If the stock-raiser will reflect for a moment upon the suffering entailed upon the child by the first of these processes, and how often disease and death result from it, and then consider how much the experience of his young colts may resemble this case in the human subject, it would pretty surely be of material advantage to his growing stock. Poor, feeble colts, with rough hair, thin flanks, staggering gait, and loss of appetite, would be cared for with better, because more intelligent, regard to their real wants.

We have recommended the following course to be pursued on stock farms, and the system can be carried out quite as easily on a smaller scale. In the pasture, or in the stable-yard, let there be placed long troughs, and salt kept constantly in them, or at least placed in them once a week. Wood ashes should be mingled with the salt, and together they will correct any tendency to indigestion in nearly all instances. Sulphur should be used abundantly at the same time; for its properties as an alterative are unrivaled.

STUMP-SUCKING, CRIB-BITING, AND WIND-SUCKING.

The strange habit known as "stump-sucking," which some horses have, is not well understood. We have seen and examined a great many animals that were addicted to it, especially colts, but must acknowledge that we know not to what cause to refer it with positiveness. It is said to be more common in the Northern States than at the South, and

still more so in some European countries. In the Southern States the practice has received the name of "stump-sucking," from the fact that the stable-lots in which stock run a great deal of their time are very often filled with old stumps of trees, and upon these the horse exercises his singular propensity. The same strange actions are manifested in older sections by gnawing the crib or manger, and hence the term "crib-biting." Still a third name is given the habit in many parts of the country, that of "wind-sucking," from a peculiarity of some "stump-suckers," of violently drawing in air through the teeth.

The affection, whatever it may really be, appears to come on by "spells," or at particular times which have no regular or periodic recurrence. When the attack does come on, however, the poor creature rushes up to the nearest object that will serve his purpose—a stump, a rail, the crib, or the manger—with such haste as though his very life depended upon it, and, seizing it with his teeth, stands biting the wood, or leans back and pulls with all the strength that the teeth will bear.

Wind-sucking is not so common an eccentricity, but when it does occur is really distressing to witness. We are not aware that it has ever been described by any writer upon the diseases of the horse, but we have seen the operation a number of times. The horse looks around him for a moment, with a wild, hurried look, and then, with a sudden start, lays hold of some hard substance, and grips it with his teeth with all the power he possesses. Straightening his neck and falling back upon his haunches, he hangs with his teeth to the wood, and sucks in the air through his throat with such force as to produce a loud, roaring noise, that may sometimes be heard nearly one-fourth of a mile away. At the same time the most awful groans escape him, almost as though "the very ribs of Nature were bursting in." At intervals he holds his breath, until the spectator begins to fear lest it should be gone forever. Then, with a slow, measured groan, increasing to a roar, he recommences to suck the wind.

With such an effort is this performed, that his lips fairly quiver, his sides tremble, and his flanks puff in and out, like a horse that has been running at the top of his speed. His ears are thrown back, with an angry look, like a stubborn mule, pulling at the halter with all his might. He shakes, trembles, groans, and sucks wind at the same instant. Presently the muscles of the jaw relax and give way, unable any longer to endure the strain, and the horse either falls to the ground or staggers wildly for a moment. This breaks the spell; he turns round, and walks off or begs for something to eat, as though nothing particular had happened.

In some cases, the horse rests the ends of his front teeth upon some hard, firm surface, with the extremities of the jaws separated about half an inch, and the tongue between them, and so remains, pressing his teeth with all the weight of his head and strength of his neck. These paroxysms, as they may be called, last from ten to forty minutes, and vary greatly in intensity. Occasionally they are very light, and the horse does nothing more than press his teeth upon the object, or merely grips it with them, for a short time.

The most inveterate case we ever knew was that of an old horse belonging to Mr. Thomas Bay, of Haywood County, Tennessee. He was a stump-sucker for many years, and we have often heard him suck wind and groan at the distance of at least one-eighth of a mile. He lived until he was twenty years old, and was always in good working condition.

By many this strange affection is considered one of the vices, or, at least, a most disagreeable habit of the horse, and such, perhaps, his nibblings of the manger may sometimes be. But when the practice is accompanied by the actions above described, we are satisfied that it should properly be classed among the animal's diseases, and venture the opinion that it proceeds from a disordered condition of the teeth, probably some neuralgic affection. It is most likely that the sufferer has somehow discovered that, by pressing his teeth upon some hard substance, or by biting and pulling with them, he can obtain relief. When one has been salivated,

and is suffering tortures from sore teeth and gums, if a small chip or piece of stick be held between the teeth and they be closed forcibly upon it, the abatement of pain will be instantaneous and great. May not the stump-sucking horse be merely resorting to the same expedient to secure temporary relief from suffering of a similar character? It is not difficult to understand how grateful such relief would be to an animal in that state, nor how pleasureable a sensation it might be to cool the hot and feverish gums by drawing the air rapidly through the teeth.

We strongly incline to the belief that the affection is a disease not only of the teeth and gums, but also embracing the membrane (the periosteum) covering the fangs of the former, and of the nerves of the adjacent regions.

One fact in the symptoms is very prominent: the horse evidently suffers during the paroxysms, and, as before stated, is sometimes even convulsed by spasms. Another is that he generally loses flesh and strength, becomes low in condition, and can not be made to thrive.

TREATMENT.

This should be directed to the teeth and gums. Try the effects of wetting the front teeth with the magic nerve liniment, morning and night, for at least ten days. Apply the liniment with a small mop to the top of the teeth, and enough will run down upon the surrounding gums. If the horse is inclined to plethora, bleed once, taking about three quarts of blood. In mild cases, this treatment will often prove of marked benefit.

A confirmed stump or wind sucker is undoubtedly impaired for usefulness in nearly all cases, and his market value materially diminished. We have treated the subject at this length in the hope that the suggestions here thrown out may be the means of eliciting the true facts in relation to the nature and causes of this singular affection.

LAMPAS.

This is an ailment principally incident to young horses, and was an object of great alarm to the farriers of former times. It is simply an inflammation of the muscles in the front part of the roof of the mouth. These have the form of a succession of little ridges—or bars, as they are called—running across the surface of that part, and constitute an extension of the palate. Their appearance, so familiar to every practical horseman, is tolerably well represented in the cut which we have introduced in the beginning of this chapter. The bars serve the purpose of assisting the tongue in moving the particles of food backward to the jaw teeth, there to be properly masticated.

That portion of the muscle next to the front teeth sometimes swells, until it extends downward not only to the level of the teeth, but, it may be, even beyond them. It becomes very sore, and greatly annoys the horse in eating, especially if his food consists of such hard substances as corn, oats, and timothy hay. He shows the pain which their pressure occasions by often dropping the food from his mouth.

Such inflammation is apt to arise from the soreness that accompanies teething, and which is communicated to the bars in the adjoining parts of the mouth. This is the reason why the young horses are more subject to it than the older ones. But changes of some kind are continually going on in the mouth; the teeth, after the operations of teething and shedding are done with, begin to wear away, and, after a time, they commence to fall out, and the gums sink down around them. As a general thing, the horse is free from lampas between the ages of five and eight years; but, at the latter period, the wearing off of the teeth becomes more marked and rapid, the gums have noticeably shrunk, and this disease is apt to appear again.

We think there is a tendency on the part of most late writers on veterinary practice to underrate the injurious effects produced by lampas. A marked derangement of the

digestive process would be no more than might reasonably be expected from the constant flow of the unhealthy saliva secreted by the feverish mouth and gums; and observation plainly teaches that when horses have been long troubled with lampas, they are likely to be found in bad condition, thin in flesh, and with a staring coat of hair.

TREATMENT.

In many cases, lampas will disappear of itself. If not, scarification is the first thing to be done. This should be performed with the point of a very sharp knife, the object being to relieve the overloaded vessels of the superabundance of blood they contain. Great care must be taken not to make the incisions too deep, or back of the third bar, just behind which an artery approaches very near to the surface, that will be quite difficult to close, if it should be severed in this operation. Should such an accident happen, the bleeding can be stopped by tying a strong cord around the upper front teeth, close to the gums, and drawing it very tightly. This will close the orifice, and check the hemorrhage at once.

The use of some mild astringent will form the proper continuance of the treatment. Alkaline solutions will often meet the requirements of the case when nothing else will. Make a strong solution of chlorate of potash—one ounce of the chlorate to two ounces of rain-water—and with this wash the mouth and gums every morning.

If the general health of the horse is not good, it may be well to bleed once from the jugular, and give the usual alteratives—sulphur and resin—or the powders mentioned in Section VII, of Chapter XXIV.

We must add our emphatic concurrence in the condemnation expressed by all respectable veterinarians in regard to the brutal custom of burning the bars of the mouth for the cure of lampas. Much of the sense of taste and of the enjoyments of eating reside in this part of the mouth, and the bars are of great service, as before stated, in moving the

food about during mastication. To burn them, therefore, is not only an act of great cruelty, but is really a permanent injury. Besides this, the hot iron often comes in contact with the teeth, and destroys their enamel, when they soon begin to decay. Caustics are equally objectionable to the mouth, and to the teeth still more so. There is not the least excuse for resorting to either of these modes of treatment, for the swelling can readily be removed by the courses prescribed above.

CHAPTER XI.

DISEASES OF THE THROAT.

Diseases of the throat and respiratory organs are very common among the horses of our climate, which is so variable, and subject to such great extremes of temperature in a short time, that twenty-four hours is sometimes enough to plunge one from summer heat into the severity of winter. Perhaps the valley of the Mississippi has, in this respect, one of the least desirable climates within the temperate zone. During much of the year, also, the atmosphere is very damp, especially in the winter and spring seasons. The horse has nothing but the superior strength of his system, enabling him better to resist unfavorable influences, to entitle him to any exemption from most of the diseases of humanity, and this advantage is apt to be fully overbalanced by the greater exposure he is compelled to undergo. Hence we find that the horse's throat and air-passages are as subject to disease as most other parts of his body, and nearly as much so as those of the human being in the same latitudes.

COLDS.

This is the simplest and most common of the class of disorders under consideration, as well in the horse as with his master. When we consider the great and sometimes prolonged exposure of the horse, it is astonishing that he does not take cold more frequently than he does. There are many farmers—and it is something for which every humane person must be thankful that their number is constantly increasing—who are as careful concerning their teams as the nature of their duties will permit; and who, knowing the advantages of good, sufficient, and regular feeding, of com-

fortable stables, and of warm blankets at the proper time, practically improve that knowledge in the habitual management and keeping of their stock. Such exemplify the Scriptural proverb that "a merciful man is merciful to his beast," and are repaid thrice over, in a pecuniary point of view alone, for their humanity.

But, to the shame of our race, this class does not embrace all horse owners. Let us put a case, such as has its counterpart every winter in nearly every neighborhood in our land. The horse is forced to his utmost speed through mud and water, storm and sleet, that his master may the sooner reach home, there to exchange the pelting storm and piercing blast for a comfortable room, a blazing fire, and a downy bed. The horse, however, is either put into a cold, open stable, or is turned into the yard, where the mud is knee-deep. His blood is boiling from the severity with which he has been driven; the snow and sleet melt upon his back; freezing winds chill his whole frame, and, through all the dreary night, he stands out in the weather, shivering and shaking with cold. Next morning he is found on the sheltered side of a straw stack, or in some fence-corner—his body drawn up almost in a heap, his hind and fore-feet almost together, his ears half drawn back, and his whole appearance the very picture of misery. As the thoughtless master, (for let us be charitable, and suppose his cruelty is not really intentional,) at a late hour, makes his appearance with the morning feed, the plaintive whicker, the dull eye brightening a little, with evident effort, and the stiffened, tired limbs well-nigh refusing obedience to the will, show too plainly the mischief that has been done: the horse has taken cold. How could he help it?

But the weather moderates, the warm sun shines out, and the horse appears as well, or nearly so, as ever. Time passes, and that dreadful night is forgotten by the owner, who never once has thought of connecting with it the idea of any injury to his horse. After a time, however—a week, a fortnight, or a month—we hear the somewhat alarmed remark, "I wonder what has given my horse such a cough?" Or,

"My horse had a dreadful attack of colic last night, and came near dying. He has not been subject to colic. I wonder what could have caused it?" Or, "I have noticed, for a few days, that he has been running at the nose. What can be the matter?" Or, "One of his eyes is terribly inflamed this morning, and is running water. I begin to fear his sight is not so sound as I thought it was." And so one might go on enumerating a dozen ailments that, at such a time, are liable to excite the surprise and anxiety of the master.

My dear, and now deeply-interested friend, just set your wits to work, and see if you can not discover a cause for all this. If you fail in this, come with me, and let us counsel together; for, "in the multitude of counsel, there is safety."

Together, we may perhaps be enabled to connect effect with cause, and thus arrive at the origin of the whole trouble. Let us go backward, in memory, for a few weeks, to that hard drive, that bitter cold night, and that overheated, steaming horse, exposed to all its severities, and then to the next morning, when you found him in the fence corner, or behind the straw-stack, quaking with the cold. Look at him again, my honest friend, as he stands there, with such a pitiful, beseeching look, drawn and doubled up, and that pleading, imploring whicker for better treatment, as you come out to his mud-lot to give him a feed of corn in a trough half filled with snow, and in the full sweep of the wind, at the highest part of the lot. Need you wonder that your horse is sick? Would not such exposure be a sufficient explanation of an attack of illness, or perhaps a death-bed, in your own case? But you say, "I am not a horse, and that is the difference." True; but a horse is flesh and blood, and his physical being is governed by the same laws as is yours; and, after all, a horse is capable of bearing but little more exposure than a man.

And now, for your own good, and for the improvement of your future practice, let me say, kindly, yet firmly, what is patent to every discriminating veterinarian: "This is work of your own doing. You are the responsible party; and, if

the horse has sickened, and should die from such treatment, it is you who have killed him, and that just as surely as though you had broken his neck, or taken an ax and split open his skull." We are of the deliberate opinion that two-thirds of the cases of lung and throat diseases in the horse are the offspring of bad treatment, of unnecessary exposure, and of colds contracted by neglect and unkindness.

It will not be difficult to trace the connection between cause and effect, so as to get, at least, some proximate idea of how these exposures and colds form the beginnings of so many serious attacks of disease. The powerful efforts which Nature makes to throw off the consequences of the bad treatment inflicted on the dumb sufferer, only serve to lull suspicion to rest. Nevertheless, these very efforts are often the sure means of producing local or specific disease. Their effects are extremely likely to concentrate upon some particular part or member of the body—the nose, head, brain, throat, lungs, stomach, bowels, feet, the glands, skin, tissues, membranes, tendons, joints, bones—we know not what portion may suffer; but rarely will the horse escape without some of them becoming involved. It would be impossible, in most instances, to assign a positive reason why any particular organ suffers more than another. Possibly it has been weakened by some strain or lesion of the parts; but of this we can seldom speak with certainty.

All the vessels and passages of the body are liable to be more or less deranged in action for the time being, if not permanently injured, from the effects of the circumstances we are considering; the pores of the skin are closed; the capillaries are congested; the secretions cease to flow; the blood is thickened, and circulates unequally in different parts of the body; the glands become swollen, and the walls of the air-passages and ducts are enlarged and sore. Now comes on a struggle with the powers of Nature, to see in which part this fiery ordeal of heat and inflammation shall reach its greatest height. Some weaker organ is the one that first succumbs. Here the fever rises higher and higher, and the

inflammation increases. The empoisoned virus of the blood rushes to this more-heated part as surely (and on somewhat the same principle, too) as the oil flows through the wick to the flame of the burning lamp.

We have pursued this subject at some length, because right here is the ground-work of the difficulty. Here are the fountains of disease, whose streams so often ruin the horse. In seven cases out of ten, disease is generated by mismanagement, bad treatment, and exposure, and thousands of the best horses in the United States die annually from these causes.

This great aggregate of unnecessary suffering, and these vast sacrifices of pecuniary interest consequent upon it, might be saved by better practices on the part of the farmer and horseman. When a system of humane and judicious treatment has been universally adopted in respect to the horse, the pristine vigor of his race will perhaps be nearly attained, even in circumstances of servitude to man; and, at any rate, the field of labor of the veterinary surgeon will be not a little circumscribed, and his practice greatly simplified.

In the moral universe, no relation can exist without some corresponding obligation. Man's relation to the brute creation is that of lord, of master, and by that he is obligated to become, at the same time, a protector and provider. As a moral duty, the prevention of suffering is made binding upon him by the law of the Creator, of whose ordaining it is that the brutes have been made subject to his dominion, or even capable of subserving his purposes. An act of cruelty, whether we commit it ourselves, or simply permit it to be done, is a grievous wrong, and it is a sin against God.

The weather being unfavorable, if the horse is much heated from his daily labors, by all means give him a good, warm, dry stable, with a clean bed of straw, and have matters so arranged that he can lie down and rest during the night. If very cold, cover his body with a warm blanket. It would be no more than you should be prompted to do,

by considerations of decency and gratitude, to take a blanket from your own bed, if need be, in order to furnish your faithful servant a proper protection after bringing you through the pitiless storm, over many a weary mile, safely to your own home, even should you then have to sit up half the night to keep up the fire in your own room, that you might not suffer from cold.

Great care should be regularly exercised in regard to food. Under no circumstances should the heated horse be given corn. If, unfortunately, nothing else is at hand, better let him stand for an hour and a half, until the heat subsides, his blood cools, and his stomach is in proper condition to receive such stimulating food; and, meantime, give him a little water, and some salt in his trough to lick. If hay or any soft feed is at hand, give him this first. A bran-mash, some meal, or some cut feed, will be the best. We say again that a horse which has performed severe labor during the day, and at night goes to the stable hot and tired, should never have any corn until morning, if any other food can possibly be procured.

ENLARGED GLANDS.

One of the forms of disease specially treated of in this chapter, is what may be classed under the general head of enlarged glands. It embraces those swellings of the glands of the mouth and throat that are unaccompanied by any severer malady, such as they are so often the mere symptoms of. While this condition may not be a specific or permanent disorder, but simply the temporary effects of cold and exposure, its tendency is toward that termination. It should, therefore, be watched carefully, and, if it lingers about at all, it should be treated much in the same way as will be directed in the next section for

SWELLED THROAT.

This general term, we are persuaded, will better suit the farmer's uses than more minute divisions of highly-educated

and scientific practitioners, some of whom have a specific name for the disease of every little organ in the throat. As our work is designed for the farmer, we prefer to adopt this name instead of the others. This whole class of diseases, in the causes, development, and treatment of each, are so much alike amid all their slight diversities of location, that this can be done without any serious confusion or lack of precision.

While engaged in the preparation of the pages for one of the preceding chapters, we saw a case of this kind on Walnut Hills, near Cincinnati. It was swelled throat from the effects of cold and inflammation of the glands.

These inflammations often become chronic, and not a few of the obstinate coughs that so much trouble both the horse and his owner have their origin right here.

Laryngitis, or inflammation of the larynx, is the most common disease, which we may consider under the general name at the head of this section. Mr. Youatt gives this description of it:

"Its approach is often insidious, scarcely to be distinguished from catarrh, except by being attended with more soreness of throat, and less enlargement of the parotid glands. There are, also, more decided and violent paroxysms of coughing than in common catarrh, attended by a gurgling noise, which may be heard at a little distance from the horse, and which, by auscultation, is decidedly referable to the larynx. The breathing is shorter and quicker, and evidently more painful than catarrh; the membrane of the nose is redder; it is of a deep modena color; and the horse shrinks and exhibits great pain when the larynx is pressed upon. The paroxysms of coughing become more frequent and violent, and the animal appears, at times, almost suffocated.

"As the soreness of the throat proceeds, the head of the animal is projected, and the neck has a peculiar stiffness. There is, also, much difficulty of swallowing. Considerable swelling of the larynx and the pharynx ensue, and also of the parotid, sublingual, and submaxillary glands. As the inflammation increases, the cough becomes hoarse and feeble,

and, in some cases, altogether suspended. At the commence ment, there is usually little or no nasal defluxion, but the secretion soon appears, either pure or mixed with an unusual quantity of saliva.

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"He who is desirous of ascertaining whether there is any disease in the larynx of a horse should apply his ear to the lower part of the windpipe. If he finds that the air passes in and out without interruption, there is no disease of any consequence either in the windpipe or the chest, for it would immediately be detected by the loudness or the interruption of the murmur. Then let him gradually proceed up the neck, with his ear still upon the windpipe. Perhaps he soon begins to recognize a little gurgling, grating sound. As he continues to ascend, that sound is more decisive, mingled with an occasional wheezing, whistling noise. He can have no surer proof that here is the impediment to the passage of the air, proceeding from the thickening of the membrane and diminution of the passage, or increased secretion of mucus, which bubbles and rattles as the breath passes. By the degree of the rattling or whistling, the owner will judge which cause of obstruction preponderates—in fact, he will have discovered the seat and the state of the disease, and the sooner he has recourse to professional advice the better."

These inflammations of the throat are generally accompanied by cold or coughs, and occasionally by bronchitis. Particular glands are frequently congested, and become choked up, their secretions becoming thickened, so that they do not flow readily, or perhaps not at all. Soreness and inflammation arise; the glands swell and puff out on the under side of the throat, and, if this condition is not bettered soon, an abscess will form, which may perhaps go on until it requires opening with the lancet.

TREATMENT.

Whatever is done ought to be done quickly, for sometimes these throat diseases are very rapid in their action.

The first resort will be bleeding, as usually the attack is not detected until it has progressed so far that blood-letting is absolutely necessary. By opening the neck vein, much blood is abstracted from the very seat of the disease, and the fever will be considerably lessened in this entire region. Let the blood run until the pulse falters. You are attacking the inflammation, not the horse, and there need be no fears about his bleeding to death.

After this, prepare the following remedy, to be used as a wash: One ounce of chlorate of potash, two ounces of golden seal, and forty grains of tartar emetic. Mix these in one pint of water, and, dividing into nine doses, give three of them daily, each morning, noon, and night.

Apply the corrosive liniment to the outside of the throat for two mornings, and, if the throat is swelling much, it will abate the symptoms readily. If an abscess is forming, substitute the May-apple liniment.

In a mild case of sore throat, the bleeding may be omitted, and, also, the corrosive liniment. But use the throat-wash, as directed; and, for three mornings, bathe the under side of the throat and between the jaw bones with a hot decoction of tobacco.

COUGH.

Nearly every disease of the respiratory organs is accompanied by a cough more or less severe. An extreme irritability of the throat, the windpipe, and the lungs, from the effects of disease and the influence of the air upon the sore and inflamed parts, is very commonly a feature of all disorders of this class. A cold atmosphere is exceedingly annoying to a sore throat, and, if drawn suddenly into the lungs, is pretty sure to excite a coughing spell.

In human pathology, one of the most frequent causes of coughing is the enlargement and soreness of the tonsils. These organs are situated on each side of the palate, and project outwardly and over the glottis (the upper part of the trachea), in the shape of an almond. Located in the tonsils are the small openings of a number of cells, or cavities, from

which flows a transparent mucus, which is pressed out in the act of swallowing, and is designed to lubricate the throat, so that the food may pass without friction through the pharynx into the œsophagus, on its way to the stomach. The tonsils are often sore and swollen; the little openings close, so that no mucus flows from them; the mouth and throat become dry and irritable, and then there is coughing. This act is simply an effort, often involuntary, to obtain relief from the dry, itchy, and irritable feeling in the throat, and to force the tonsils to disgorge the mucus from its cells; and when a sufficient quantity has been forced out by the pressure of the muscles, in coughing, to once more lubricate the throat, the unpleasant sensations subside, there is a temporary respite, and the cough ceases for awhile.

The horse, however, has no tonsils such as the human species is furnished with, and hence his cough can not proceed from exactly the same cause as that here mentioned; yet the same effect is produced in his case by dryness of the lining membrane of the trachea and air-passages of the lungs. The secretions of the parotid and other glands furnish a vapor to the warm air, as it is inhaled in the act of respiration, and this vapor is deposited on the smooth, delicate mucous membrane which lines the nasal cavities, the mouth, the throat, and air-passages, and serves to keep it moist. Inflammation and fever tend to evaporate this moisture much faster than it is supplied, and the membrane is left dry. Coughing is the method by which Nature seeks to force an increased supply of moisture from the glands, in order that the membrane may receive the vapory deposits necessary to its comfort.

One very important object obtained by the act of coughing is the disgorgement of the morbid secretions, which are thrown out by the glands of the mouth and throat, and sometimes by the lungs. Instead of being a thin, transparent fluid, these are changed into a thick, coagulated mucus, sometimes even tough and stringy in character. Of this large quantities are removed in the acts of coughing and expectoration, and the relief thus obtained is very great. Much

of the labor of chronic cough consists in the disgorging and throwing out this irritating and troublesome matter from the lungs and air-passages.

Another slight benefit arising from coughing, yet only very temporary at best, is effected by the rapidity with which the air rushes over the dry and irritated surface, for the moment cooling its fever and allaying the burning heat. A slight friction of the parts is also produced, which serves very much the same ends as a gentle scratching, where it itches and burns.

The sound of coughing is occasioned by the violent concussion of the air, as it is forced from the lungs through the glottis into the larynx, in which are formed the vocal intonations of man and all the higher types of animals.

Any disease that affects the respiratory organs and passages, whether the various parts of the throat, or the trachea, the bronchi, the lungs, or the pleura, to such an extent that fever and inflammation are caused, will give rise to a cough. If the disease becomes chronic, so will the cough. The latter will share the fate of the other in that case; yet cough sometimes remains after an acute attack of disease has been pretty thoroughly subdued. Among the various ailments in which coughs originate, we may name the following: Soreness and inflammation, of whatever sort, of the throat and its passages, and of the trachea and lungs; bronchitis, pneumonia, consumption, and pleurisy.

There are other diseases that at times sympathetically affect the lungs and throat, and are apt to be marked by more or less of coughing, though this will pass away when the more severe symptoms of the disorder disappear. Such are indigestion, worms, derangement of the liver, and distemper.

TREATMENT.

This may prove somewhat difficult, as coughs are often obstinate and unyielding. Usually the cough may be abated in a short time, and perhaps to a very great extent; but a cough stopped is, by no means, one cured. It clings in-

separably to the disease which produced it, and occasionally even remains after that disease has been utterly routed. Only those cases which are lingering or chronic will require special directions for treatment, as all others will yield to the remedies that cure the diseases in which they originated.

The proper time to begin the treatment of a cough which makes its appearance as one of the fruits of exposure and colds, is at its earliest development. The first time the horse is heard to cough, notice should be taken of the fact, and its cause be investigated at once and diligently. If it proves to be occasioned simply by dust or chaff, nothing will be required but to give the animal a drink of water. On the other hand, should it be from a cold or sore throat, active treatment should be begun forthwith. Put the ear to the throat, near the jaw-bone, to ascertain whether any rattling of the larynx or the glottis can be detected; and note carefully whether the horse, in drinking, gulps his water and straightens his neck after swallowing, as though it hurt him. Such symptoms as either of these indications constitute must not be neglected.

Extract from the jugular or neck vein three quarts of blood. Then prepare as follows: One table-spoonful of gunpowder, one of soft soap, two of lard, one of tar, and one of gum myrrh, finely pulverized. Mix this well, and divide into six doses. Each morning put one of them down the horse's throat with a paddle or spoon, and at night drench him with half a gill of the solution of chlorate of potash—one ounce of the chlorate of potash to a pint of water.

After this, if he stands in the stable, give as much sulphur and resin as he can be induced to eat; but if in time of pasture, green grass will be the best thing in the world for him.

In the spring of the year, bleeding may not be necessary, unless the horse's condition is very bad. In a mild case, the faithful use of the throat medicine, with a careful bathing of the throat, for two or three successive mornings, with the hot decoction of tobacco, will nearly always remove the cough. But in the winter, the case will be pretty sure to be

obstinate, sufficiently so to necessitate active and energetic employment of the whole treatment.

MALIGNANT EPIDEMIC.*

"In 1714, a malignant epidemic was imported from the Continent, and, in the course of a few months, destroyed 70,000 horses and cattle. It continued to visit other countries, with but short intervals, for fifty years afterward. Out of evil, however, came good. The continental agriculturists were alarmed by the destruction of their property. The different governments participated in the terror, and veterinary schools were established, in which the anatomy and diseases of these animals might be studied, and the cause and treatment of these periodical pests discovered. From the time that this branch of medical science began to receive the attention it deserved, these epidemics, if they have not quite ceased, have changed their character, and have become comparatively mild and manageable. As, however, they yet occur, and far too fatal, we must endeavor to collect the symptoms, and point out the treatment of them.

"The malignant epidemic was almost uniformly ushered in by inflammation of the mucous membrane of the respiratory passages, but soon involving other portions, and then ensued a diarrhea, which no art could arrest. The fever, acute at first, rapidly passed over, and was succeeded by great prostration of strength. The inflammation then spread to the cellular texture, and there was a peculiar disposition to the formation of phlegmonous tumors; sometimes there were pustular eruptions, but oftener deep-seated tumors rapidly proceeding to suppuration. Connected with this was a strong tendency to decomposition, and, unless the animal was relieved by some critical flux or evacuation, malignant typhus was established, and the horse speedily sunk.

"The most satisfactory account of one of these epidemics is

* The ravages of this epidemic form a highly interesting, though startling, page in the history of veterinary science. The epitome embodied in this section is from Youatt.

given us by Professor Brugnone, of Turin. It commenced with loss of appetite, staring coat, a wild and wandering look, and a staggering from the very commencement. The horse would continually lie down and get up again, as if tormented by colic; and he gazed alternately at both flanks. In moments of comparative ease, there were universal twitchings of the skin and spasms of the limbs. The temperature of the ears and feet was variable. If there happened to be about the animal any old wound or scar from setoning or firing, it opened afresh and discharged a quantity of thick and black blood. Very shortly afterward the flanks, which were quiet before, began to heave, the nostrils were dilated, the head extended for breath. The horse had, by this time, become so weak that, if he lay or fell down, he could rise no more; or if he was up, he would stand trembling, staggering, and threatening to fall every moment. The mouth was dry, the tongue white, and the breath fetid; a discharge of yellow or bloody fetid matter proceeded from the nose, and fetid blood from the anus. The duration of the disease did not usually exceed twelve or twenty-four hours; or, if the animal lingered on, swellings of the head and throat, and sheath and scrotum, followed, and he died exhausted or in convulsions.

"Black spots of extravasation were found in the cellular membrane, in the tissue of all the membranes, and on the stomach. The mesenteric and lymphatic glands were engorged, black, and gangrenous. The membrane of the nose and pharynx was highly injected, the lungs were filled with black and frothy blood, or with black and livid spots. The brain and its meninges were unaltered."

DIFFICULTY OF BREATHING.

Many horses give evidence of considerable difficulty in breathing, and to such an extent, in many cases, that the animal is incapacitated for any thing but the slowest kind of work. Such a condition may result from a partial change in the organization of the substance of the lungs, or from

some obstruction of the air-passages. This affection of the horse is variously designated, according to its different manifestations. In England, the sound produced is what decides the name, and hence veterinarians and horsemen in that country speak of roarers, whistlers, wheezers, pipers, etc. There are, also, the terms "thick wind" and "broken wind," both of which are very appropriate, and, to a certain extent, are in use in this country as well as in Great Britain. Difficulty of breathing, in the Southern States, is known as "bellows," and in the Northern States as "heaves." These terms relate to precisely the same affection—broken wind—and are derived from the rapid and labored motion of the animal's flanks in respiration.

Perhaps it would serve every purpose to include all these distinctive names under one comprehensive term, such as that at the head of this section; but, as the farmer will probably recognize what they stand for more readily under the customary titles, we will treat separately broken wind, thick wind, and roaring. The former two are most commonly the permanent effects left in the wake of those two dreadful diseases bronchitis and pneumonia, or inflammation of the lungs.

BROKEN WIND, BELLOWS, AND HEAVES.

The lungs act on the principle of a pair of bellows, worked by the power of the respiratory muscles. If they are impaired, and portions of them closed up, it will require a more labored effort of the muscles to keep them blowing. As exercise increases, the blowing increases also, in both volume and rapidity, and greater exertion is required, of course, to blow the bellows fast than slow. The action of the lungs is thus much quickened, the breathing is short, and the sides puff in and out like a pair of bellows indeed. Hence the name by which this affection goes in Dixie, while the synonym "heaves," employed in Yankee-land, originates in the same peculiarity.

In broken wind, the air is drawn into the lungs—or in-

spired, as the technical word is—somewhat more quickly and laboriously than in health; but, when it is forced out in expiration, a singular and characteristic phenomenon appears. This is a peculiar and forcible double action, the ordinary expiration being succeeded by another, evidently a labored one. The cause of this is a change in the structure of part of the lungs, in which the walls between some of the air-cells are broken down, so that the usual action of the respiratory muscles is not sufficiently powerful to expel all the air. Such a condition is called *emphysema*. In the second expiration, all the muscles of the chest are called into play.

Says "Stonehenge:" "The pressure of unchanged air is a constant source of irritation to the lungs, and, although sufficient may be expired easily enough to carry on their functions while the body is at rest, yet, instinctively, there is a desire to get rid of the surplus, and hence the two acts of respiration. Immediately after this second act the muscles relax, and the flank falls in, and this it is which catches the eye in so remarkable a manner. On examination after death, the lungs are found to remain enlarged, and do not collapse, as in the healthy condition. They are distended with air; and this is especially the case when the *emphysema* is of the kind called interlobular, in which the air has escaped into the cellular membrane. In the most common kind, however, the cells are broken down, several being united together, while the enlargement pressing upon the tube which has opened into them diminishes its capacity and prevents the ready escape of air."

TREATMENT.

A cure of broken wind is impossible, since the trouble originates in an organic injury. The ruptured walls of the pulmonary tissue can never be built up again by the skill or medication of man. But the disease may be greatly palliated by proper attention to feeding, and regular and judicious exercise. The horse should not be watered for at least an hour before going to work, nor be put at severe labor while the

stomach is distended with food, for the lungs ought to have the freest and fullest play possible. Oats will be an excellent article of diet. In England, carrots are considered of great benefit in this and similar diseases of the respiratory organs.

THICK WIND, WHEEZING, ETC.

Thick wind is the general name applied to the defective respiration of the horse when there is no clearly-defined unnatural noise, and there are no signs of the condition known as *emphysema*, described in the last section. It is characterized by a short, quick, and labored breathing, as well of inspiration as of expiration. Sometimes the bronchial tubes are the seat of the trouble, from their diameter becoming lessened by a thickening of the mucous membrane with which they are lined; but, usually, it follows pneumonia, and is caused by the *hepatization* of a portion of the lungs—that is, some of the air-cells are closed up or obliterated, so that only a part of the lungs is available for the purposes of respiration. This part has extra labor thrown upon it, of course; and the breathing is necessarily quicker, in order that the blood, which it was intended should be acted upon by the air in every portion of the lungs, may not suffer, now that only a part of their air-surfaces can be used.

This trouble often precedes "broken wind;" but, while that disorder is the effect of particular affections of the lungs, nearly all of them are attended or followed by thick wind, or wheezing. Unlike broken wind, the latter often passes away with the disease that produced it.

TREATMENT.

This will be of the same character as that prescribed in the last section for broken wind, and can not be expected to do more than simply mitigate the symptoms.

ROARING.

This is the name given in England to a disease exceedingly rare in this country, although some parts of Europe contain

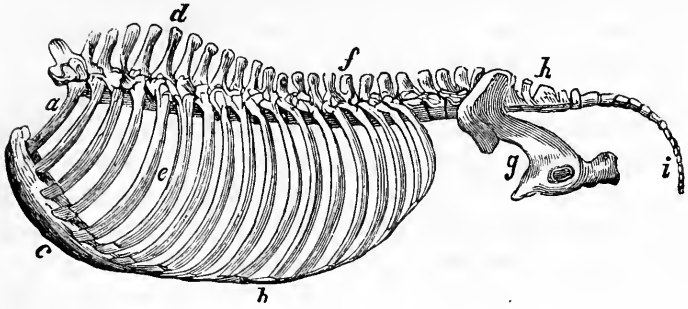
a great many roarers. From the accounts of British veterinarians we cull the following statements concerning it: It is produced by obstruction in some part of the respiratory canal, oftenest in the larynx, and next to that in the trachea. Sometimes these obstructions are originally caused by bands of coagulated lymph in the trachea, or elsewhere. Chronic cough occasionally terminates in roaring. The majority of roarers are draught horses, and horses of quick draught.

Facts are said to establish the hereditary predisposition to this affection beyond a doubt. "Major Wilson, of Didlington, England," had a valuable stable horse; but he was a roarer, and so were many of his colts. On the other hand, "Eclipse" and "Taurus," two celebrated racers of England, were roarers, but none of their colts were.

This is a rather strange concatenation of assertions and contradictions to be derived from the same sources; and thus we leave the subject and the roarers of England.

CHAPTER XII.

DISEASES OF THE CHEST AND LUNGS.



a The first rib.

b The cartilages of the eleven hindermost, or *false* ribs, connected together, and uniting with that of the seventh or last *true* rib.

c The breast-bone, or *sternum*.

d The top, or point, of the withers, which are formed by the lengthened spinous, or upright, processes of the first ten or eleven bones of the back. The bones of the back (*dorsal vertebræ*) are eighteen in number.

e The ribs, usually eighteen on each side; the first seven united to the breast-bone by cartilage; the cartilages of the remaining eleven united to each other, as at *b*.

f That portion of the spine where the loins commence, and composed of six bones (the *lumbar vertebræ*).

g The bones forming the hip, or haunch, and into the hole at the bottom of which the head of the thigh-bone is received.

h The portion of the spine (the *sacrum*) belonging to the haunch, and consisting of five pieces.

i The bones of the tail, usually seventeen in number.

CHEST FOUNDER.

THE muscles of the horse's breast are sometimes the seat of a peculiar soreness and swelling never satisfactorily accounted for, and not known to be connected with any other

disease. Probably this condition is the result of cold settled in these muscles from some cause; or, it may be, from some strain or lesion of them, or of their connection with the tendons. Some have supposed it to be a form of rheumatism. The affection was formerly called chest founder, and by that name is still best known to most American farmers.

Whatever the real causes of the attack, its symptoms are obvious enough. The horse manifests pain when he is touched; there is evident stiffness of the shoulders and legs during motion, and, at times, there is considerable fever.

TREATMENT.

Wash the breast in some warm salt and water in the morning, and again at night; and on the second day apply the corrosive liniment to the chest. Give as a drench, as hot as the animal can bear it, a pint of salt and water, in which has been stirred half an ounce of ground ginger and one dram of tartar emetic. Six days will usually be long enough for this to do its work; but, if necessary, its use may be continued longer, until a decided improvement is perceptible.

In a bad case, bleed moderately.

BRONCHITIS.

Bronchitis is but one of the legitimate fruits of exposure, such, for instance, as that depicted at the opening of the last chapter, where we saw the heated and steaming horse turned out into the cold and biting storm, there to stand shivering and freezing in the mud, through a long winter night. As a consequence of that treatment, there was first a cold, next enlarged glands, and then swelled throat. Happy that horse and owner if the difficulty goes no further than this. Sometimes it will not; but often the inflammation creeps downward from the larynx through the trachea into the bronchi and air-passages of the lungs.

Bronchitis is an inflammation of the mucous membrane lining the bronchial tubes, which membrane, becoming filled with blood, the diameter of the tube is sensibly diminished,

so that some difficulty and an increased rapidity of breathing is the consequence. "After a time, a frothy mucus is poured from the membrane, and this still further interferes with respiration, and necessitates a constant cough to get rid of it. These symptoms are always present; but they will vary greatly in intensity, and in the rapidity with which they progress, from which circumstances bronchitis is usually said to be *acute* or *chronic*, as the case may be."

The discharge in bronchitis is mainly of a purulent, mucous character, with clots of blood and plugs of matter from the nose. The disease gradually steals its way along the line of the trachea to the air-tubes, and even the substance of the lungs, and the inexperienced will have some difficulty in distinguishing it from pneumonia, which is its very frequent termination. The horse is very sensitive to pain, and his nerves are all alive to excitement. That he feels the full force of his suffering is manifest by his haggard look, and also by his evident dread of suffocation, which causes him to remain standing and motionless. There is a hard, dry cough; the breathing is hot, and noticeably quickened; the pulse is full and rapid, beating sixty or seventy times per minute, and the membrane of the nose is of a deep florid red.

When the ear is placed to the throat and chest, (which is that most useful means of forming a true diagnosis of all pulmonary diseases, which the books describe under the name of *auscultation*,) there is heard a dry, rattling sound, differing materially from the crepitation—the murmurous, crackling sound—of pneumonia. Upon the formation of mucus, this is succeeded by gurgling, and what have been called "soap-bubble sounds," forming a distinctive feature of bronchitis that is easily recognized.

TREATMENT.

The treatment of this disease is so nearly identical with that to be prescribed for pneumonia, in the next section, that it will be sufficient to refer the reader forward to that connection.

PNEUMONIA, OR INFLAMMATION OF THE LUNGS.

This follows hard after bronchitis, in most instances where it occurs, and the horse generally dies. In only a small proportion of cases is it possible to effect a cure. Where the horse has a strong constitution, and his vital forces are all in energetic play, if the disease be attacked in season, there will be some chance of overcoming and removing it. The process of treatment, however, will prove long and arduous.

Primary or pure pneumonia, as it is called, is undoubtedly found to exist, at times, without attendant bronchitis; but it is equally certain that the two diseases are intimately connected, in the great majority of cases. Perhaps pure pneumonia is oftener accompanied, or rather preceded, by bronchial irritation than is now generally supposed; but this symptom being so involved in the severer ones which follow after with great rapidity, it is apt to be overlooked. When the progress of the disease is slow, however, the bronchial symptoms are seen clearly as a separate link in the chain.

Pneumonia is commonly ushered in with a chill, the horse shivering all over. Presently this passes off, and is succeeded by an unnatural degree of warmth. Before long another chill comes on, more severe than the former, and lasting somewhat longer. Thus there may be three or four recurrences of these chills before any other conspicuous symptoms are manifested. The extremities are deathly cold from the very outset. On putting the hand to the legs or the ears this will be noticed in an instant. As the symptoms progress, the breathing becomes hurried and distressed, averaging about one inspiration each second; the pulse, though oppressed, is quick, running up to sixty-five or seventy per minute; the mouth and breath are very hot; there is a short and evidently painful cough; the fore-feet are wide apart, from the animal's instinctive effort to dilate the chest as much as possible; and the sound heard in auscultation is a peculiar crisp crackling, which some have likened to the crackling of a dried bladder. This sound is caused by the infiltration of blood into the air-

cells. The lungs are in a state of fearful congestion, and it often happens that simple congestion, such as may be caused by violent over-exertion at any time, brings on an attack of pneumonia.

"The unfavorable symptoms," says Youatt, "are, increased coldness of the ears and feet, if that be possible; partial sweats; grinding of the teeth; evident weakness; staggering, *the animal not lying down.* The pulse becomes quicker, and weak and fluttering; the membrane of the nose paler, but of a dirty hue, the animal growing stupid, comatose. At length he falls, but he gets up immediately. For awhile he is up and down almost every minute, until he is no longer able to rise; he struggles severely; he piteously groans; the pulse becomes more rapid, fainter, and he dies of suffocation. The disease sometimes runs its course with strange rapidity. A horse has been destroyed by pure pneumonia in twelve hours. The vessels ramifying over the cells have yielded to the fearful impulse of the blood, and the lungs have presented one mass of congestion.

"The favorable symptoms are, the return of a little warmth to the extremites, the circulation beginning again to assume its natural character; and, next to this, the lying down quietly and without uneasiness, showing us that he is beginning to do without the auxiliary muscles. These are good symptoms, and they will rarely deceive.

"Congestion is a frequent termination of pneumonia. Not only are the vessels gorged—the congestion which accompanies common inflammation—but their parietes are necessarily so thin, in order that the change in the blood may take place, although they are interposed, that they are easily ruptured, and the cells are filled with blood. This effused blood soon coagulates, and the lung, when cut into, presents a black, softened, pulpy kind of appearance, termed, by the farrier and the groom, *rottenness*, and being supposed by them to indicate an old disease. It proves only the violence of the disease, the rupture of many a vessel surcharged with blood; and it also proves that the disease is of recent date;

for, in no great length of time, the serous portion of the blood becomes absorbed, the more solid one becomes organized, the cells are obliterated, and the lung is hepatized, or bears considerable resemblance to liver."

TREATMENT.

As already stated, the treatment for pneumonia and bronchitis is essentially the same. The first thing to be done is to bleed, taking three pints of blood from the neck vein. Next, wash the entire neck and chest with a weak decoction of tobacco, as hot as it can be safely applied, and as soon as this is dry, bathe the chest with the corrosive liniment.

A hot drench—as hot as it can be made without scalding—is the next step in the treatment. This is to consist of two ounces of Epsom salts in a pint of salt and water. Follow this with a preparation of gentian and ginger. Take one ounce of each and boil them in one quart of water, until their strength is out, or until there is only a pint of water left. Divide this into four doses, of which give the horse one in the morning and another at night. These doses may be kept up as long as the symptoms warrant their use.

A clyster of warm soap-suds will be of benefit, to follow the first drench. As only a light discharge from the bowels is to be sought, the use of strong purgatives must be avoided with the utmost care. They will be very likely to induce inflammation of the bowels, in the present condition of the patient, and only tend to hasten a fatal termination.

No symptom of pneumonia is more characteristic than cold extremities, sometimes even icy cold; nor is there any so easily recognized. It will greatly improve the condition of the feet and limbs to bathe them with strong salt and water, as hot as the horse can bear it, and then to rub them well with a coarse cloth or brush.

The food must be very light. Green feed will be best, but if this can not be procured, bran-mashes, a little meal, or some chopped feed will do very well instead. Until there is a marked improvement in his condition, the horse will not

attempt to eat any thing; nor is it at all desirable, even if it were not useless, to coax him to do so.

When the patient is so much better that he can be turned out, give him the run of a good pasture, if possible; or, if too feeble for this, keep him warm in the stable, until he gains strength. In any case, great care must be taken to prevent a relapse. The condition of the lungs will hardly be that of sound health for a long time afterward, even if the animal can be carried through without becoming broken-winded. Not unfrequently an attack of pneumonia seems to permanently enfeeble the constitution and shorten life. After a good interval of rest, (seldom less than two months, when the attack has been an acute one), the horse may be put to light work, which may be gradually increased in severity, as he is found capable of it.

CONSUMPTION.

Consumption in the horse is oftener than otherwise the successor of pneumonia. It is generally but the finishing stroke, the final winding up of the long train of evils following exposure and neglect. Those were the cause; this is the result. Inflammation in the lungs has produced rupture of the air-cells, and the mucus and blood has mingled together in lumps or knots, and, under the influence of the prevailing local fever, these masses have become coagulated and constitute what are called *tubercles*. These are of a pale yellow color, varying greatly in size, and still more in number, the latter being dependent upon the number of the air-cells destroyed by the inflammation. If pneumonia leaves behind it but a few of these tubercles, and not much irritation remains in the lungs, they may pass to a state of induration—that is, hardness and dryness—without occasioning any harm. But in these bodies there is always a strong predisposition to growth, and the formation of tubercular matter, a kind of yellowish white pus, of a creamy appearance, and coagulable by the action of heat, acids, and alcohol.

Tubercles are frequently found in the lungs, and some-

times exist there for a long time, without seriously injuring the horse. But we have many doubts whether they can long remain there without some growth, some increase in size, though it be very slowly. Almost any irritating cause may occasion their enlargement. Exposure, colds, extra labor, derangement of the stomach and bowels, a general feverish condition of the system, and certain specific diseases, may send such unhealthy influences to the lungs through the blood as to excite tubercular growth and the formation of matter. The healthy parts of the lung are involved by degrees, and gradually destroyed; and now consumption has fairly entered on its fell career. The yellow, almost purulent, mucus raised from the lungs is the pus of the tubercles, which has burst through their cells into the air-passages of the lungs, when it is expectorated by the human patient, and in the horse escapes through the nostrils.

The reader must bear in mind, that in the foregoing description, the tubercles have been supposed to originate in the diseased condition of the lungs consequent upon pneumonia, bronchitis, or pleurisy; but this does not imply that consumption invariably follows those disorders, or even that their tubercular formations necessarily produce it. Nor do we wish to be understood to say that tubercles may not exist in the lungs of the horse quite independent of them, and indeed of all other affections. We are satisfied that they may so exist, and that consumption may establish itself in the lungs as a primary disease. Perhaps the latent virus of scrofula is the not uncommon, though seldom suspected, instrumentality which develops consumption in many of these cases.

The symptoms of consumption do not vary much from those of inflammation of the lungs, except in intensity. There is a much slower but still more morbid action going on in the lungs; the pulse is feeble; the nose, ears, legs, and even the skin, constantly feel not only chilly, but of a clammy, death-like coldness; the membrane of the nose is of a pale and ashy color; the breath is hot and very offensive; there is

a very severe and painful cough, and the nose is continually discharging a purulent matter, often mixed with blood.

Consumption kills more horses than is generally supposed. It is apt to be mistaken for some other disease, in many cases, and is even less understood by the mass of horse owners than its kindred diseases, pneumonia and bronchitis. All of these sometimes run their course so rapidly that irreparable mischief is done before the keeper awakens to a realization of the true condition of the suffering animal.

TREATMENT.

The hope of a cure in a case of genuine consumption is slight indeed; and it will not do for the practitioner to effect improvement simply, although that may be very great. Not only must life be prolonged, but the patient must be made sound and well, and capable of full service, or nothing is accomplished; and the skill and judgment of the veterinarian is gauged, not by the measure of success that attends his treatment, but by its perfect success. The human patient willingly submits to medical treatment for months, or even years, and is happy if life is merely preserved and made tolerably comfortable, so that he can get about a little. To secure this, he regards scarcely any sacrifice as too great. In respect to the horse, however, this amounts to nothing; yet seldom, exceedingly seldom, can any thing more be done for him if pulmonary consumption is fairly established. He may be patched up a little, so as to regain sufficient strength for some quite light service, but a sound, strong horse he never will be again. In nine cases out of ten, it will be worth twice the after value of the horse to "cure" him, as many would use the term.

Mercy can be the only inducement to undertake any treatment after the disease has passed its earlier stages. Much suffering may be alleviated, and this might well be a sufficient motive for adopting that course. But the pecuniary view is that which would control the action of the great majority of our farmers, and, perhaps, necessarily so in many cases.

A radical cure is an impossibility, except in the first stages of the malady; but the symptoms of that period seldom receive any attention, and thus the golden opportunity is forever lost. When the tubercles have commenced breaking in the lungs it is too late. To those who are disposed to try their skill in treating a consumptive horse, we give the following directions:

Bleed moderately, taking three pints of blood at first, and on the sixth day afterward the same quantity again. For the general building up of the system, and especially to act upon the skin, give sulphur and resin. Accompany this with the following preparation for the throat and lungs: One pint of new milk, one gill of French brandy, one gill of honey, and half an ounce of finely-pulverized gum myrrh. Mix, and divide into two doses—one to be given in the morning, and the other at night. Continue the use of this remedy until the patient recovers or dies.

This treatment will produce a marked abatement of the symptoms, at least in the early stages of the disease. It is worth a trial at almost any period, and it will rarely fail to relieve the distressing cough.

Perhaps a good pasture will prove better than any medicine, and, at any rate, will prove a valuable adjunct to the course of treatment. But watchful care must be taken to prevent such exposures as might induce colds, etc. Comprehensively stated, the attention and general treatment extended the patient must be kind and generous throughout.

We may appropriately conclude this subject by quoting the cautionary language of Youatt, which is yet hopeful in that it impliedly recognizes the chance of a cure:

"When this disease has been properly treated, and apparently subdued, the horse can not be summarily and quickly dismissed to his work. He is sadly emaciated; he long continues so; his coat stares; his skin clings to his ribs; his belly is tucked up, notwithstanding that he may have plenty of mashes, and carrots, and green meat, and medicine; his former gayety and spirit do not return, or, if he is willing to

work, he is easily tired, sweating on the least exertion, and the sweat most profuse about the chest and sides; his appetite is not restored, or, perhaps, never has been good, and the slightest exertion puts him completely off his feed."

PLEURISY.

This is a disease of the pleura, the membrane which invests the lungs and lines the entire cavity of the chest. It may be the follower of bronchitis, and the adjunct of pneumonia, and is generally the offspring of exposure and bad treatment. It may affect both sides or only one of them. Fortunately, the farmer's practice does not often include the treatment of this disease in our country, and probably not more than one in five hundred of our readers will ever be called upon to undertake a case of this kind.

By the masses of farmers and horse-owners generally, pleurisy will be very likely to be mistaken for pneumonia, or, perhaps, even for bronchitis. It has a number of quite distinctive symptoms, however, most of which may be recognized without much difficulty by any ordinarily careful observer. One of the most characteristic of these is the peculiar respiration, the inspiration being short and very painful, from the extremely irritable condition of the pleura, consequent upon inflammation, while the expiration is affected by allowing the chest to fall slowly, and affords an interval of very great relief. The feeling is that which the human patient calls the *stitch*. Still, the breathing is somewhat quickened, raising to forty or fifty respirations per minute. The pulse is considerably accelerated, but, though small toward the last, is strong and wiry throughout; whereas, in pneumonia, it is oppressed and sometimes hardly appreciable. The nostrils and eyes are of a natural color, or nearly so, and the former are not dilated. The legs, instead of being extended, as in pneumonia and bronchitis, are rather drawn together. The head is protruded rather than drooped; the expression anxious, but brightening at times, at least in the earlier stages; and when the sufferer turns to look at his flanks, his move-

ments are more sudden and spasmodic than in pneumonia. As in that disease, he can not be induced to lie down. There is a short, hurried cough, not easily distinguishable by most observers, however, from that which marks bronchial or pulmonary disease. The temperature is apt to be variable. Sometimes it is even warmer than natural, and, though generally the reverse, the extremities are never so deathly cold as in pneumonia. The mouth, upon the other hand, is not so hot, and the breath, in this respect, is almost natural.

TREATMENT.

This is substantially the same as that prescribed for bronchitis, with the addition of copious applications of corrosive liniment to the sides, low down, both in front and back of the shoulders, and between the fore-legs.

CHAPTER XIII.

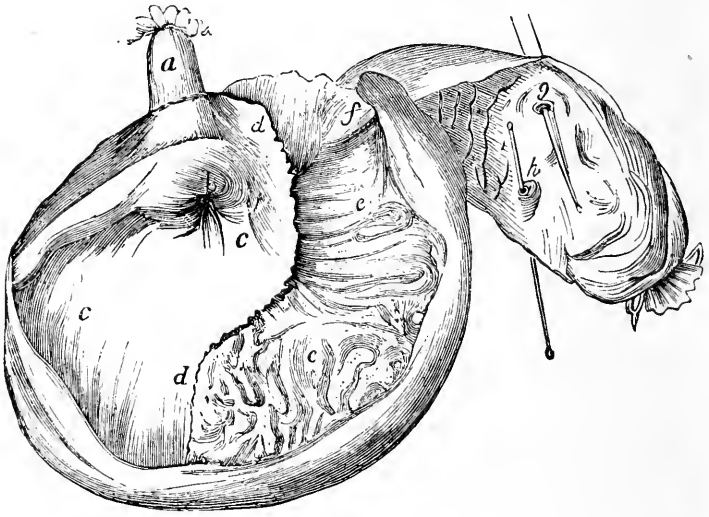
DISEASES OF THE STOMACH AND BOWELS.

The digestive organs of the horse, particularly the stomach and bowels, are more subject to disease than any others; while, from their location and their peculiar service in the animal economy, it is more difficult to understand the minutiæ of their structure and functions than those of any other portions of his system, except the lungs. Besides the embarrassment to which the latter circumstance gives rise in treating intestinal diseases, there is this additional one: that the symptoms exhibited are so varied that the practitioner is often in great danger of being entirely misled as to the real nature and causes of the disorder.

The stomach is the receptacle of not merely what the horse eats as food, but likewise of every nostrum which ignorance and quackery can force into it, and which too often itself proves the fruitful source of disease. To its inner coating a merciful Creator has given a degree of insensibility, which, though its only safeguard, is a powerful one; yet even this is not always sufficient to protect it from the dire effects of the poisons poured into it. Considered in relation to the bulk of his entire body, and especially to the enormous capacity of the abdominal cavity, the stomach of the horse is very small, being only three or four times as large as in man, whose body is scarcely one-tenth the size of that of his faithful servitor. It contains but two or three gallons, while the intestines, when fully expanded, have a capacity of from twenty to twenty-four.

So far as is known, it is provided with no gastric agencies, and conducts the process of digestion no further

than simply softening down the food. The remaining operations are carried on in the intestines, which, by their great length, presenting an immense extent of surface filled with absorbents, are especially adapted to the per-



THE STOMACH.

a The œsophagus, or gullet, extending to the stomach.

b The entrance of the gullet into the stomach. The circular layers of the muscles are very thick and strong, and which, by their contractions help to render it difficult for the food to be returned or vomited.

c The portion of the stomach which is covered by cuticle, or insensible skin

d d The margin, which separates the cuticular from the villious portion.

e e The mucous, or villous (velvet) portion of the stomach, in which the food is principally digested.

f The communication between the stomach and the first intestine.

g The common orifice through which the bile and the secretion from the pancreas pass into the first intestine. The two pins mark the two tubes here united.

h A smaller orifice, through which a portion of the secretion of the pancreas enters the intestines.

formance of this duty. A remarkable peculiarity in the anatomy of this organ in the horse, is strikingly indicative of its limited part in the functions of digestion. As is well-known, it is the mucous membrane which is furnished with

the minute absorbents whose office it is to take up the digested particles of food, in the form of chyle, and transfer them to the general circulation. While this coating lines the entire inner surface of the intestines, not more than one-third of that of the stomach is similarly provided, there being in the latter only a small patch of it, no larger than the two hands would cover, in the upper part, near the esophagus.

Though apparently free from bilious disorders, the horse is frequently a sufferer from various derangements of the digestive functions, some of which are liable to assume the gravest character quite suddenly. The simplest and least hurtful of these is

SOUR STOMACH.

The purely vegetable food of the horse, in the mouth receives an imperfect mastication, with a merely partial moistening from the saliva; and in this condition it passes through the esophagus, or "swallow," to the stomach, where it is shut in above by the closing of the esophagus, and below by that of the *pylorus*—literally the door-keepers—which is the outlet to the alimentary canal. Here the crude material, greatly thinned by the quantity of water drank, is softened down into a pulpy mass called chyme, to allow whose passage into the small intestines, the *pylorus*, at the proper time, relaxes, and soon the stomach will be clamoring for more food.

When the animal is in sound health, this process goes on with perfect regularity and comfort; but, unfortunately, such is not always his condition. Irritation and undue heat often occur in the stomach, producing fermentation or sourness of its contents. He is likely, indeed, to bring about these uncomfortable results at any time, by eating either improper or too much food. It is in some disturbance or other of digestion that the prime cause may be found of the diseases, not only of the stomach itself, but likewise of those of the bowels; and, hence, also, the for-

mation of those gases betrayed by low rumblings, and other indications, which nearly always occasion restiveness and suffering, and often end in an attack of flatulent colic.

During this fermentation, carbonic acid gas is given off, and sometimes with such rapidity that stricture of the *pylorus* takes place. The stomach soon becomes most painfully distended, from the constant accumulation of the gas, which the extreme heat of the organs, meanwhile, continues to greatly rarify. The owner soon finds that he has upon his hands a case of

COLIC IN THE STOMACH.

The symptoms become more and more aggravated, and, unless relief can be given, there is imminent danger of rupture of the stomach, which must kill the horse, of course. Few persons suspect how frequently this sad event happens.

A case which, several years ago, came within the author's own observation, at the village of Petersburg, Lincoln County, Tennessee, is so exactly in point that it merits a narration in detail. A horse, about ten years old, and in good condition of flesh, had been sick for several days, refusing all food, and manifesting the usual symptoms of intestinal disease. With the towns-people, including the owner, this was a plain case of bots; and when the writer first saw him, a large man, weighing at least two hundred pounds, was riding him about the streets, to cure him by means of a charm which the fellow pretended to possess. An opinion being asked, it was promptly given, to the effect that the stomach-pump afforded the only hope, though the sufferer was probably too far gone for even this to save him; and that, as no such instrument for the horse could be found in the State, he must certainly die. About two hours afterward, he suddenly fell dead.

A bystander at once suggested that, if the horse were cut open, his stomach would be found "perfectly riddled by the bot." The idea was caught up by the entire crowd, of

not less than fifty persons, and, to gratify the general desire, the author consented to make an examination. The carcass was removed to a suitable place; and when, in a few minutes, the viscera was fairly laid open, the cause of death was visible to all. The stomach was literally torn into shreds, and its contents were scattered throughout the entire abdominal cavity. So great had been the concussion, that the diaphragm was ruptured, and fragmentary debris from the stomach, was found in the region of the heart and lungs. No special indications of inflammation were discoverable in its coatings, although the organ was nearly destroyed by disease. The mucous membrane was entirely gone, and the cuticle was so much decomposed that in appearance it resembled gauze, or fine net-work, falling out as if it were an extraneous substance when the stomach was detached from its connection. The muscular coating was also much decomposed, and had become a soft mass, so that it could be torn almost like a piece of wet paper. A spectator described its condition by the blunt remark, "The thing is all rotten." The *pylorus* was still closed, its fearful stricture, whence had proceeded all the mischief, remaining as before death.

In the small intestines traces of inflammation were abundant. Ten feet or more of these, immediately next the stomach, presented a blood-red appearance, and similar patches were found along the entire line of the bowels. From the stomach to the anus there was not a particle of alimentary substance. This empty condition invariably characterizes cases of this kind, all the contents of the bowels below the stricture being speedily voided.

Inflammation had undoubtedly existed throughout the digestive organs in a high degree, but fuel had been added to the flames by drenching the poor animal with almost incredible quantities of so-called medicines. The stomach must have contained at least two gallons of these nostrums: sweet oil, castor oil, turpentine, epsom salts, sweet milk, molasses, sage tea, and several others. In all probability

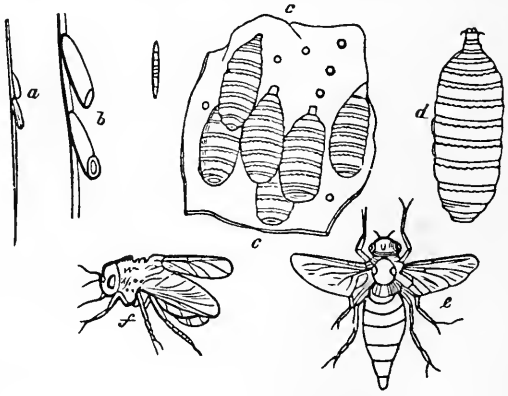
the horse fell a victim to excessive drenching rather than disease, and would have had a much better chance for recovery if nothing at all had been given him.

The diseases of the stomach, described in the foregoing pages, may be recapitulated in their proper order as follows

Sour stomach, produced by fermentation of the food.
Exhalation of gases, causing painful distension.
Inflammation, followed by decomposition.
Spasmodic colic, with paroxysms of agony.
Rupture of the stomach, and death.

THE BOT.

This is the proper place to consider this so-called disease, whose supposed frequency and fatality render it a subject of deep interest to every proprietor of the horse. It has given rise to numberless theories regarding both its cause and cure, all



CUT OF THE BOT AND THE GAD-FLY.

a and *b* The eggs of the gad-fly, adhering to the hair of the horse.
c The appearance of the bots adhering to the walls of the stomach.
d The bot detached.
e and *f* Gad-flies.

strenuously urged by earnest advocates, of whom, nevertheless, there are exceedingly few but are willing to confess they know next to nothing of the habits and office of the

bot, or of the effects created by the little creature's presence upon the horse's general system. Nearly all agree in this, however: that, in some way, the bot does kill the horse The common opinion is that he effects this by seizing hold of the stomach, from some rabid propensity which possesses him at certain undetermined periods, and eating or cutting his way entirely through its walls; and as to a remedy, that all depends upon the speedy administration of something which will compel him to relinquish his hold before his ravenous work has produced irreparable injury.

These views are grossly erroneous. From personal investigations, the author is satisfied that the public mind has been entirely misled upon the whole subject. What is supposed to be the ravages of the bot, is, in reality, the work of some inflammatory disease. To begin with, the natural history of the bot has never been properly understood. The bot is hereditary with the horse, and is born into the world with him, the colt, at the moment of foaling, having the little parasite in his stomach in as perfect a state as the horse of six years. He is found attached to the cuticular or insensible coating in the upper portion of the stomach—not by his head, as is popularly supposed, but hanging by his tail. For a mouth he has a little orifice, no larger than the point of a cambric needle, with which he feeds upon the food in the stomach, after it has been softened down into chyme. This tiny mouth he can close against any substance which offends his dainty taste; and, being protected by a scaly or bony covering, upon which no acid, caustic, or poison will operate, he is much safer from the action of any hurtful element than the horse into whose stomach he is introduced. There is no evidence that in his normal condition he ever injures the horse's health in the least degree.

The bot is an entirely different insect from the grub, or worm, with which he has no relationship whatever. The latter is the offspring of the gad-fly, and is, undoubtedly, an intruder. It is a species of light yellow worm, which passes away from the horse in the excrements during the months

of July and August, and becomes imbedded in the earth, where the chrysalis is formed, whence, in time, is hatched the fly. The eggs of the fly are deposited upon the horse's skin, are bitten off, and find their way into the horse's stomach. Here the worm is developed in turn, and thus the species continues to be propagated. Unlike the bot, the grub never attaches itself to the coating of the stomach, but lives among the particles of food, the tough, fibrous portions of which it decomposes, and, in both the stomach and bowels, undoubtedly performs the same office for the horse that worms do in the child. When multiplied in great numbers, the grub may occasion much uneasiness and irritation, but never causes death, or even serious disease.

Although the stomach is often found "completely riddled by the bot," as the popular expression is, there is good reason to believe that the work is done entirely after the horse is "struck by death." One or two facts will go far to prove the truth of a proposition which to many will appear so extraordinary.

The cuticular coating of the stomach, to which the bot fastens himself by means of two little bearded hooks, is nearly, if not wholly, insensible, having no more feeling, apparently, than the animal's hoofs. When the horse is in health, it is hard, rigid, impenetrable, and the bot, if ever so much disposed to do so, would attack it in vain; but when death seizes him, this coating becomes relaxed and soft, and begins rapidly to decompose. Then only it is that the bot can, or ever does, work his way through it. Another fact, still more strongly corroborative of the above proposition, is this: that of any number of horses killed while in perfect health, and opened an hour or two afterward, there will be found not one whose stomach is not "riddled by the bot." Dissection has revealed the existence of this condition in hundreds of instances of sudden death from accident.

Dr. John Franklin, of Sumner County, Tenn., relates the case of a horse instantly killed by the falling of a large timber, whose carcass he opened within a few hours after

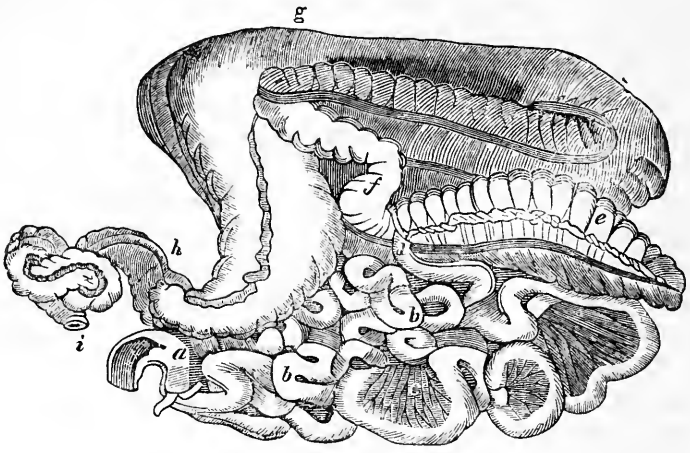
death, with the especial object of testing the theory that the bot forces a passage through the walls of the stomach, in all cases, when the disease is not of such a nature as to stupefy him. As he expected, the insects, in considerable numbers, had already cut their way out.

The bot does not attack the stomach for the purpose of preying upon it, or of injuring the animal, but simply to seek escape from certain death himself. The same disease that is killing the horse threatens his destruction also. An instinct, similar to that which prompts vermin of nearly all kinds to leave a dead or dying carcass, teaches him that his old habitation is no longer a safe one, and hence his desperate endeavors to get away. He has been found working up to the esophagus, passing through the small intestines, and even cutting through between the ribs almost to the skin itself. If possible, he would escape from the horse entirely.

INFLAMMATION OF THE BOWELS—ENTERITIS.

In all the fatal cases of bots, so-called, there exist other causes amply sufficient to produce death, the large majority being examples of putrid inflammation of the bowels—or enteritis, as it is scientifically designated—very frequently complicated with stricture. That this disease may be fully understood, it will be necessary to give a short description of the anatomy of the parts involved, which are very similar in their structure to the corresponding organs in man. Proceeding from the stomach, the outlet of which is called the *pylorus*, or pyloric orifice, commences the line of small intestines, in the horse from fifty-four to sixty feet in length, and comprising three divisions, the duodenum, the jejunum, and the illeum. The duodenum is that portion extending from the pylorus to the hepatic or biliary duct, which in the horse empties into the intestines about twenty-two inches from the stomach, or ten inches further than in man. The jejunum occupies about two-fifths of the length which remains, and, as its name implies—jejune, or empty—is

generally found, after death, filled with nothing but air. The ileum is the fleshy part of the bowels. Then come, in succession, the cæcum, or blind gut, which is the first of the



CUT OF THE INTESTINES.

a The commencement of the small intestines. The biliary and pancreatic ducts may be seen a little below.

b b The convolutions or windings of the small intestines.

c A portion of the mesentery, a fold of serous membrane, which hangs over the greater part of the intestines, and is thickly inlaid with fat, designed to protect the included organs from cold and violence, and to facilitate their movements.

d The small intestines, terminating in the cæcum

e The cæcum, or blind gut, with the bands running along it, puckering and dividing it into numerous cells.

f The beginning of the colon.

g g The continuation and expansion of the colon, divided, like the cæcum, into cells.

h The termination of the colon in the rectum.

i The termination of the rectum at the anus.

large intestines; the colon, the largest convolution of all; and the rectum, terminating in the outlet of the anus. The intestines are composed of three distinct coatings, or layers, namely: the outer, or peritoneal, which forms the smooth, glassy investment of the contents of the abdominal cavity in general; the middle, or muscular one, consisting of two sets of fibers running transversely with the

direct line of the intestines, and crossing each other at right angles; and the inner coating, the villous or mucous membrane, which is spread, not only over the surface of the bowels throughout, but, as we have seen, over a portion of that of the stomach also.

In enteritis, it is usually the jejunum, or airy subdivision of the small intestines, which is the seat of disease. Stricture, or stoppage, follows inflammation, and, in turn, produces spasms of the bowels; and hence the disorder specifically known as spasmodic colic. Under the sympathetic influences of the feverish state of the bowels, the food sours in the stomach, and the carbonic acid gas which is evolved escapes into the intestines, here becoming greatly expanded and rarified by the abnormal heat of the parts. Painful distension is speedily the result. As the gas irritates the sensitive membrane, and increases the fever, so the fever, in turn, continues more and more to expand the gas and air. And now arises the peril of a grave and peculiar complication. Whenever this distension occurs in any portion of the bowels, there is nearly always an equal contraction in the parts just beyond. As a net when pulled out in one part draws in at another, in like manner this distension and contraction reciprocally affect each other, until, at length, the bowels become firmly locked up, affording no passage whatever. This constitutes a stricture.

The horse experiences great and increasing distress, and soon spasms set in. These appear to subside, at length, but presently they come on again, with redoubled violence. The poor sufferer sweats profusely, especially about the shoulders and sides, and scarcely less about the neck and head. He shakes and trembles constantly, twitching the muscles of his body convulsively; he paws with his fore-feet, and putting them out, tries to stretch himself; he throws his head around to the side, as if to indicate where the pain is. Suddenly he lies down, and, endeavoring to roll over on his back, in that position strikes the fore-feet violently against the chest, and then as suddenly springs to his feet again. Throwing back

his ears, as if angry, he swiftly starts off, turns around two or three times, and drops to the ground. All his motions are rapid, and he continues switching and jerking his tail almost incessantly. No signs of swelling are discoverable; but the lips and ears are very cold, and the pulse ranges from 65 to 80 per minute, whereas it should not be more than from 30 to 36.

All these manifestations of acute suffering are caused by the severe inflammation and attendant contraction of the bowels, which are in imminent danger of becoming ruptured. This catastrophe nearly always forms the fatal climax in those cases where the horse suddenly drops dead.

Sometimes, when the stricture occurs at a considerable distance from the stomach, the intestines become perforated with small holes, over which, however, the mucus of the bowels may slough so as to fill them up, when, for a time, the patient appears to be growing better. But nothing can save him. He wastes away with fever, continuing for days, or, it may be, for even weeks, and inevitably dies at last.

The small intestines are much the most sensitive part of the alimentary canal, and, when affected by disease, they are the seat of pain proportionately acute. They are, also, the ones most subject to attacks of enteritis, and of irritation ending in stricture; and as they are situated so far forward in the abdominal cavity as to be principally incased by the ribs, it is almost impossible to discover any swelling, even in the advanced stages of disease.

Yet irritation and stricture often happen in the large bowels also. These swell, and become greatly distended; the sides are pressed out, and the disease at once betrays its character as colic.

There is no difference between this case and the one we have described more at length, except that the location is not the same. One is no more the colic than the other. In nearly all instances the attack is brought on, no matter which form it assumes, by immoderate eating or drinking, or, what is still worse, by both together. If in perfect health, the horse may

gorge himself, perhaps scores of times, with impunity; but if there is any considerable derangement of the digestive functions, Nature, whose laws are every-where coincident, exacts the penalty of suffering, if not of death.

TREATMENT.

It would be impossible to condemn too strongly the stupid practice, usually resorted to, of making the horse's stomach a receptacle for every vile nostrum which ignorance and presumption can devise. A great many more horses are killed by excessive drenching than would die if nothing at all were given them. One person recommends one thing, and another advises something else, until, presently, a dozen or more different remedies have been prescribed, each of which, though claimed as a certain specific, usually has no effect save to hasten a fatal termination. The anxious and over-excited owner, that no effort may be left untried to save his faithful animal, gives all that he is bidden to; and when the end comes, to which he himself has so largely but unwittingly contributed, he shakes his head in hopeless wonderment at the power of disease, or the strange ferocity of the bot.

Yet there should be treatment of some kind, and that as speedily as possible; for, though it is true that the horse might recover without a finger being moved to assist him, no one can know this positively. On the other hand, all must recognize the fact that many disorders, in the systems of both man and beast, which at first are susceptible of easy control, may at last baffle the utmost skill of the practitioner, if neglected too long.

The same methods will be equally effective, whether the trouble has arisen in the large or the small intestines. The great object to be obtained is a passage of the bowels, which must be brought about with all possible speed. When this is done, the horse's recovery may be guaranteed. As to the bot, the inoffensive little creature is never likely to do half as much damage as ignorant and foolish bystanders are. The system must be relaxed at once, that contraction and stric-

ture may be relieved. Bleeding, then, must be the first resort, affording the only hope in obstinate cases. It is the sheet-anchor of the practitioner's treatment. The bleeding should be from the neck vein, and never from the mouth. Blood is neither food nor medicine to the horse, but is positively hurtful when taken into the stomach, in nearly all cases. Moreover, it is impossible from the mouth to take enough blood, or with sufficient rapidity to produce the desired effect It should flow rapidly, so that the required quantity may be discharged in the shortest time possible.

The bleeding should be continued until there is a perceptible faltering of the pulse. As comparatively few persons know where to look for the pulse, it will be proper here to describe it again, and, if possible, so plainly that its location can not be mistaken. It can readily be found by pressing the fingers upon the sub-maxillary artery, which passes directly over the extreme lower part of the under jaw-bone, where it feels like a small cord running across the edge of the bone, under the skin. By resting the fingers upon this artery, the pulsation can be felt and counted in precisely the same manner as in one's wrist. If the owner has any timidity, let him remember that bleeding does not at all endanger the life of the animal. It is not the horse which the lancet attacks, but the disease.

All that is needed in the form of medicine is some simple remedy to correct the acid condition of the stomach, which organ, even when not itself the seat of disease, is quickly affected sympathetically; and, when there is fermentation of the food in consequence of obstructions, its own condition is the occasion of great distress. For this purpose, chloroform is the best prescription, and is especially valuable from the fact that a small dose suffices to secure very speedily the desired effects. It is a powerful anodyne, allaying this condition of the stomach at once; gives instant relief from pain, and causes a speedy relaxation of the whole system. The dose should be a table-spoonful, in a gill of whisky mixed with half a pint of warm water—a remedy so perfectly harm-

less that there need not be the least fear in administering it; for, although chloroform is heating in its tendencies, its properties, when the stomach is in the condition we have described, undergo an entire change before it reaches the seat of inflammation in the bowels.

The object of this simple medication, it must be borne in mind, is not to affect the bot; because not only does no medicine reach that portion of the stomach where the bot is located, but it would not disturb him if it did. Of the thousand baneful compounds given to kill the bot, or to "make him let go his hold," as the common phrase is, not one ever accomplished its object, unless at the expense of the horse's life also. They are much less offensive to the bot than scores of substances of which the horse often partakes freely. If the bot is invulnerable to the effects of oak and hickory leaves, pennyroyal, dog-fennel, "jimson" leaves and berries, and many other plants equally noxious, the sage tea, the milk, the molasses, and the like, may as well be thrown out to the pigs. These can do no good whatever, except as they may possibly tend, in a limited degree, to correct the acidity of the stomach.

In case the chloroform can not readily be procured, some strong soap-suds, weak lye, or a table-spoonful of soda, dissolved in a pint of milk, will serve as a substitute; and even the simple mixture of common salt and water will answer an admirable purpose. If the last named is used, it should be made by dissolving in a pint of warm water—as hot as the horse will bear it—all the salt which the liquid will hold in solution. It often proves almost as efficacious as chloroform.

Having proceeded energetically with the treatment thus far, the practitioner, for the rest, must rely upon the immediate use of the clyster. Three table-spoonfuls of turpentine, added to a pint of melted lard, makes one of the best and safest clysters known. Warm soap-suds, thin starch, or salt and water, may be used for the same purpose, and are very simple and effective. If no syringe is at

hand, a long-necked bottle will do instead; the bottom, or back end, being elevated, the contents will be readily discharged into the rectum. A horn, or a long-necked gourd is nearly as convenient. Let nothing prevent this operation from being attended to, nor from being repeated until a passage is obtained. Whoever the person is that has charge of the case, he must be fruitful in expedients. If one convenience is not to be found, he must employ the substitute nearest at hand. Above all, he must see that the work is not only done, but done thoroughly.

When a discharge from the bowels has been secured, the horse is safe for the present. His food should be light, and if it is in the season for it, pasture alone will be the best. He should have daily exercise, increasing from time to time, as he grows able to bear it. For three or four days, he should have as much pulverized sulphur and rosin, as he can be induced to take; four ounces of the sulphur and two of the rosin, at a dose.

Before proceeding to consider the diseases of the large intestines, it will be well to refresh our memory in regard to the anatomy of these parts, which is well represented in the last cut. The cæcum, with its remarkable blind pouch, appears at *e;* the colon, at *f gg;* and the rectum between *h* and *i*, the latter of which is the outlet, the *anus.*

The cæcum, or blind gut, holds about four gallons, and in it are countless little absorbents, as it is from here that the greater part of the nutritive elements of the chyle is supposed to be transferred to the circulation. It serves as a reservoir for the large quantities of water which the horse drinks, and much of which passes directly to the blind pouch without tarrying in the stomach or intervening small intestines. The colon, in which the last processes of digestion are completed, is very large, filling about two-fifths of the abdominal cavity. In the rectum, the last of the intestines, the excrement accumulates in little balls, which receive their shape and consistency from the action of the numerous little

cells of the colon, until the horse is disposed to evacuate them by the contraction of the proper muscles. In a horse of medium size, the large intestines will hold, altogether, about nineteen gallons.

FLATULENT COLIC.

This disease has its location in either the cæcum or the colon, or sometimes in both. The colon is the part most violently affected.

It may be excited, in great part at least, by sympathy with a diseased state of the stomach and small intestines, which can not be much inflamed without affecting the whole line of the alimentary canal. But its most frequent cause is undoubtedly what may be termed stricture of the rectum—contraction of the rectum upon the hard masses of excrement with such force that the passage even of gases becomes impossible. If such a stricture did not occur somewhere, there could be no flatulent colic, of course, since all the gases usually generated would very readily escape in the natural way.

We have seen how common it is for these foul gases to be evolved during digestive disturbances in the stomach and small bowels. There may be fermentation of the contents of the cæcum and colon, producing the same results; and, usually, the difficulty is greatly aggravated by the accumulations of gas pressing downward from the stomach and the small intestines intervening.

Flatulent colic evidences pre-existent inflammation in some part of the alimentary tube, or, at least, great unnatural heat, which generates the noxious gases. These distend the colon, and then, one part of the net being drawn out, the other part draws in; in other words, when the colon is greatly distended, there is a corresponding contraction at the throat of the rectum, and there the hard masses of excrement become so firmly impacted that it often requires a considerable manual exertion to dislodge them. Such a condition is not likely to occur except when the stomach has been gorged with immoderate

quantities of food, and the collection of the fœces is correspondingly great.

TREATMENT.

Sometimes the horse will recover from an attack of flatulent colic without any assistance. The stricture relaxes sufficiently to allow a passage of the fœces, when, the obstruction being removed, the gases readily escape, and the horse is at once relieved.

But such an issue can not be calculated upon, and energetic treatment must be commenced at once, for, in all diseases of this kind, time is precious.

The essential thing to be done is to remove the impediment to the passage of the gases which are causing such a painful expansion of the bowels. A clyster will often effect this, in connection with bleeding. It may be of salt and water, of soap-suds, or of lard, as is most convenient. By these means, the parts may be so relaxed as to admit of a passage, and, when this point is reached, the danger is over.

The only course which can be infallibly relied upon, however, is the operation which the books speak of as *back-raking*, consisting simply of the removal of the impacted balls from the throat of the rectum by the hand. The stricture takes place about eighteen or twenty inches from the anus. The hand and arm should be well greased, and gradually pushed forward to the place of the obstruction, and the balls carefully removed. If the forefinger is pushed through the ball, it can be pulled along more readily; but the ball is generally too hard to permit of this being done. In this case, the forefinger must be gently passed over the ball, which is then to be rolled backward. Such will be the force with which the rectum contracts upon the hand and arm that the pain will become very great to the operator, and he will probably be compelled to withdraw the arm for a time.

INFLAMMATION AND RUPTURE OF THE COLON.

If the stricture of the rectum be not relieved, the difficulty grows more and more serious. From the accumulation of the gases, the colon is distended to an almost incredible extent. The sides of the flanks are puffed out, and the horse looks as though he had been inflated with wind. The prevailing fever and heat rise constantly, and the symptoms become more and more acute. No one who has ever witnessed an attack of this kind can forget the terrible manifestation of pain which it has occasioned.

Subjected to a terrible strain from the expansibility of the heated gas, and even disorganized, to a certain extent, by its poisonous qualities, the coatings of the intestines at length give way, and become perforated with little holes. From that moment the horse is doomed. Up to this period there may have been hopes of a recovery, but this catastrophe settles the question. It will be almost impossible to decide the time of its occurrence, and perhaps the patient even seems better, as the fearful distension of the bowels is now greatly relieved by the escape of the gas through the perforations. If these are large, death will soon ensue; but if small, the horse may possibly linger for several days.

TREATMENT.

The attack we have been describing is essentially the same as enteritis, or perhaps it is only a form of that disease, and hence the treatment must be of the same character.

Our first operation is bleeding. It relaxes the parts, and thus accomplishes what medicines will not and can not do, for they never reach the seat of the trouble. But bleeding having been efficiently performed, medicines may be of much assistance in what remains of the treatment. The properties to be sought in their selection are those which will neutralize and destroy the poisonous gases, and that will make the remedy both a disinfectant and an anti-spasmodic. The chloroform mixture prescribed for enteritis possesses all

these, and is the best preparation known for securing the desired effects. If there is high fever, it will prove injurious, just as will all other powerful medicines. But it may be safely employed in the large majority of cases, and is not only exceedingly efficient, but rapid in its action. Next in value to the chloroform is that simple prescription, hot salt and water. This never does any harm, and its materials are always at hand.

In the first stages of the attack, bleeding and a quart of hot salt and water will rarely fail to cure. If the case is severe or obstinate, bathe the flanks and the parts between the hind legs with the salt and water, as hot as the horse can bear it; or, still better, do this with the hot decoction of tobacco. Such a course tends to hasten the relaxation of the parts materially.

INFLAMMATION AND BLEEDING OF THE RECTUM.

This is a condition we have frequently been called upon to treat in our veterinary practice. It usually either accompanies or follows inflammation of the colon. Sometimes it is apparently both a feature and a successor of that disease.

Not only is there inflammation and swelling, but there is protrusion, forming the *prolapsus ani* of the doctors, and blood is discharged from the parts in considerable quantities.

TREATMENT.

Such a case demands immediate attention. Cold salt and water is the remedy, applied as both a wash and a clyster. The addition to this of a slight infusion of chlorate of potash, and also some of the golden seal, will decidedly increase its efficiency. It may be used as often as convenient.

If this condition is not connected with any disease of the bowels, no bleeding will be necessary.

SORENESS AND ITCHING OF THE ANUS.

Following after diseases of the rectum, and occasionally from other causes, the anus sometimes becomes sore and ir-

ritable, the parts showing a peculiar dryness and scurfiness. The horse rubs the roots of his tail, often until nearly all the hair is worn away. Many persons imagine the trouble lies about the roots of the tail or the hairs. But the irritation really exists at the point we have named, and the parts which the horse rubs are as near it as he can reach. Sometimes, however, the itching may be occasioned by worms.

TREATMENT.

Keep the parts well greased with some lard, in which a little fine salt has been mixed. This will soon remove the trouble. In a few cases, we have found the soreness to exist just within the rectum, and have successfully modified the treatment by pressing a little of the salt lard, and some golden seal just within the anus.

CHAPTER XIV.

DISEASES OF THE LIVER, URINARY ORGANS, ETC.

The purpose which the liver subserves in the animal economy is an important one, and upon the proper discharge of the functions of this organ the health of any animal is largely dependent. It is in the liver that the bile is eliminated from the blood, and hence this viscus is considered a gland, by far the largest one in the body. Using the terms *excretion* and *secretion* in the distinctive senses indicated on page 58 of this work, the action of the liver is both secretive and excretory—secretive because the admixture of bile with the chyle is essential to the healthy performance of the digestive process; excretory because if the bile were allowed to remain in the blood, it would vitiate and poison the entire circulation. These considerations will better enable us to understand how important a bearing the condition of this organ must have upon the general health.

In the horse, the bile from the liver, together with a whitish fluid from the pancreas (or *sweet-bread*, as it is vulgarly called) enters the small intestines at the termination of the duodenum, about twenty-two inches from the pyloric orifice of the stomach. These secretions are conveyed through the biliary and pancreatic ducts, which are shown near *a*, in the cut of the intestines, in the preceding chapter. The horse has no gall-bladder, so that the bile, as fast as it is eliminated from the blood, passes directly to the intestines. He is less subject to liver complaints than either any of the remaining domestic animals, or his master—man.

This is a circumstance which the farmer may well be thankful for, on account of the obscurity of the symptoms in such cases, and the extreme difficulty of determining precisely

what the trouble is. In fact, it is only by a *post mortem* examination that the most experienced can make a diagnosis, even tolerably satisfactory. Perhaps the following extract from that usually precise and reliable veterinarian, Youatt, will illustrate all that we could wish to say upon the vagueness and uncertainty which surrounds our knowledge of hepatic diseases:

"If horses, destroyed on account of other complaints, are examined when they are not more than five years old, the liver is usually found in the most healthy state; but, when they arrive at eight or nine or ten years, this viscus is frequently increased in size; it is less elastic under pressure; it has assumed more of a granulated or broken-down appearance; the blood does not so readily permeate its vessels, and, at length, in a greater or less quantity, it begins to exude, and is either confined under the peritoneal covering, or oozes into the cavity of the belly. There is nothing, for awhile, to indicate the existence of this. The horse feeds well, is in apparent health, in good condition, and capable of constant work, notwithstanding so fatal a change is taking place in this important viscus; but, at length, the peritoneal covering of the liver suddenly gives way, and the contents of the abdomen are deluged with blood, or a sufficient quantity of this fluid has gradually oozed out to interfere with the functions of the viscera.

"The symptoms of this sudden change are pawing, shifting the posture, distension of the belly, curling of the upper lip; sighing frequently and deeply; the mouth and nostrils pale and blanched, the breathing quickened; restlessness, debility, fainting, and death.

"On opening the abdomen, the intestines are found to be deluged with dark venous blood. The liver is either of a fawn or light yellow, or brown color, easily torn by the finger, and, in some cases, completely broken down."

Hemorrhage of the character above described, when it is checked before the animal suffers much from it, is said to produce the genuine *gutta serena* of professional oculists, that

kind of glass eye which occasions permanent blindness; but upon this point our experience does not enable us to add testimony of any sort.

JAUNDICE, OR YELLOWS.

The liver of the horse is sometimes attacked by inflammation, from one of whose symptoms the disease is known by the names here given. "Yellows" is the word of the common people. The best authorities of recent date discard the term "jaundice" as being apt to mislead, the slightly yellowish tinge of the eye and skin being no indications of such a state as is understood when it is applied to the human patient.

Youatt's description of the disease, though under the old designation, is very good.

"Jaundice occasionally appears, either from an increased flow or altered quality of the bile, or obstruction even in this simple tube [the biliary, or hepatic duct]. The yellowness of the eyes and mouth, and of the skin where it is not covered with hair, mark it sufficiently plain. The dung is small and hard; the urine highly colored; the horse languid, and the appetite impaired. If he is not soon relieved, he sometimes begins to express considerable uneasiness; at other times he is dull, heavy, and stupid. A characteristic symptom is lameness of the right fore-leg, resembling the pain in the right shoulder of the human being in hepatic affections. The principal causes are overfeeding or overexertion in sultry weather, or too little work, generally speaking, or inflammation or other disease of the liver itself.

"It is, at first, necessary to inquire whether this affection of the liver is not the consequence of the sympathy of that organ with some other part; for, to a very considerable degree, it frequently accompanies inflammation of the bowels and the lungs. These diseases being subdued, jaundice will disappear. If there is no other apparent disease to any great extent, an endeavor to restore the natural passage of the bile by purgatives may be tried, not consisting of large doses, lest

there should be some undetected inflammation of the lungs or bowels, in either of which a strong purgative would be dangerous; but, given in small quantities, repeated at short intervals, and until the bowels are freely opened. Bleeding should always be resorted to, regulated according to the apparent degree of inflammation, and the occasional stupor of the animal. Plenty of water, slightly warmed, or thin gruel, should be given."

TREATMENT.

Our remedies in this disease are necessarily constitutional, rather than specific; or, perhaps, it would be still more proper to class them as preventives. They consist of sulphur and resin, and a very free use of the bark of the yellow poplar, either in the form of a powder, or as a decoction, to be administered as a drench. If this bark, in chips or pulverized, be kept in the manger, the horse will eat considerable quantities of it. It acts as one of the best of tonics for him. Golden seal operates very advantageously in the same manner, and, in connection with sulphur and resin, forms a most excellent tonic alterative. The dose is one ounce of the powder, in his feed or in the compound of sulphur and resin. But, above all the alteratives known to the profession generally, we give the preference to the "jimson" seed. This may be considered the liver and blood medicine for the horse.

To the above list of remedies may be added Prof. Dale's powders (see Chapter XXIV), which are highly recommended for their action upon the blood and general system of the horse.

ENLARGEMENT OF THE SPLEEN.

What is the precise function of the spleen—or *melt*, as it is commonly called—has never been fully demonstrated. This strange organ is subject to enlargement, but from what cause, or by what remedies to counteract it, no one seems to have more than surmised. We confess to an entire igno-

rance in relation to a subject which, at any rate, is of no practical moment to the farmer. Youatt says the spleen "has been ruptured," but to bring this about must certainly require the most extraordinary violence.

INFLAMMATION OF THE KIDNEYS, OR NEPHRITIS.

The kidneys are frequently the seat of disease, one of whose most acute manifestations is that of their inflammation, technically denominated *nephritis*. The causes of this condition are various. Perhaps as common as any is exposure of the loins to wet when the animal stands still for a long time, especially if the atmosphere is raw and chilly, as well as damp. We know that when certain substances also are introduced into the stomach and subjected to the digestive process, that their absorption results in great irritation and disturbance of renal action (renal being a word that signifies "relating to the kidneys," which were anciently called the *reins*). Thus, moldy feed of every kind is found to have a strong tendency to bring on urinary diseases. Many strong diuretics, of which ignorant practitioners are so extremely fond, possess the same hurtful properties in such degree as should condemn their use entirely, except, perhaps, in the hands of a man of known experience and caution. To this class belong all such mineral poisons as saltpeter, nux vomica, blue stone, and copperas.

Severe strains, and other injuries of the loins and hips, seem often to cause inflammation of the kidneys, though the connection between the two circumstances is not very obvious; and it has been supposed that the disease, in such cases, is developed by exposure to cold while in a state of exhaustion, or that some branch of the venal artery or vein has been ruptured by the violence of the preceding exertion.

We believe that bad treatment of every kind predisposes to venal affections as one of the effects of constitutional debility, and its tendency to functional derangement. For this reason, therefore, if the many stronger ones were all lacking, low, damp situations should always be avoided, and the foul

air and fetid breath of many stables ought never to be tolerated. Finally, whatever produces disorder in the digestive apparatus will be quite apt to extend its harmful influence to the kidneys, also, as adverted to above.

"The early symptoms," says Youatt, "are those of fever, generally; but the seat of the disease soon becomes evident. The horse looks anxiously round at his flanks; stands with his hind legs wide apart; is unwilling to lie down; straddles as he walks; expresses pain in turning; shrinks when the loins are pressed, and some degree of heat is felt there. The urine is voided in small quantities; frequently it is high-colored, and sometimes bloody. The attempt to urinate becoms more frequent, and the quantity voided smaller, until the animal strains painfully and violently, but the discharge is nearly or quite suppressed. The pulse is quick and hard—full in the early stage of the disease, but rapidly becoming small, yet not losing its character of hardness. These symptoms clearly indicate an affection of the urinary organs; but they do not distinguish inflammation of the kidney from that of the bladder. In order to effect this, the hand must be introduced into the rectum. If the bladder is felt full and hard under the rectum, there is inflammation of the neck of it; if it is empty, yet on the portion of the intestines immediately over it there is more than natural heat and tenderness, there is inflammation of the body of the bladder; and if the bladder is empty, and there is no increased heat or tenderness, there is inflammation of the kidney."

TREATMENT.

Bleeding should be resorted to at once, in order to abate the inflammation. An ounce of assafetida, or even more if the case is urgent, may be given safely, as a pill. A third of a pound of Epsom salts, administered in the usual manner, will do nearly as well. Make a free application of the magic nerve liniment to the loins; or the corrosive liniment may be used instead, if more convenient. The patient should be plied with a small quantity of sulphur and resin daily. The

latter is a mild diuretic, and the only one which should be given.

If it is winter-time, be sure and see that the stable is warm and dry; and should it turn cold, cover the animal with a blanket. The feed should be light and moist, a large proportion of it green. If pasture can be had, no other food will be needed.

Especial attention should be paid to removing the causes of the disease, if they still exist; and, in all cases, the entire diet should be changed at once. The effect of this course upon the character of the urine will soon prove of marked benefit. When feeding any horse moldy and unwholesome food, the owner might profitably stop and consider whether he is not losing two dollars in horse-flesh where he saves one in the cost of hay and oats of the best quality. If an attack of this disease follows the use of such food, he can not escape conviction under the charge of having produced it; and if the horse dies, he is the destroyer.

PROFUSE STALLING, OR DIABETES.

Of this disease we know but little more than its existence, and its obvious manifestations in a troublesome and excessive flow of urine. Of course, it proceeds from an unnaturally increased action of the kidneys, but its primary causes are obscure. Strong diuretic medicines, as might be expected, sometimes develop it; and unwholesome food, such as mow-burnt hay, moldy fodder, etc., has a similar tendency. In England, the disease is said to be much more common than formerly.

TREATMENT.

We recommend a decoction, or tea, made of whortleberry leaves, the plant known to the botanist as the *uva ursi*. Take two ounces of the leaves and boil them well in a quart of water. This will make two doses, one of them to be given in the morning of each alternate day, the treatment being continued until the trouble is removed. Bleeding will not be necessary in this case.

Be at pains to remove from the customary diet every article of food having a diuretic tendency, especially if it is foul and unhealthy generally. If this is neglected, you run the risk of soon having a case of inflammation of the kidneys on your hands.

BLOODY URINE, OR HÆMATURA.

Bloody discharges are sometimes mixed with the urine, and this may occur, in connection with its flow, in natural increased or diminished quantities. Occasionally the blood passes away in lumps of a somewhat dingy hue, but it is oftener diffused through the urine, giving it a highly-colored brownish-red tint. The causes of this phenomenon are not well understood, but it is believed to be occasioned by some mechanical injury within the kidneys or about the region of the loins—some lesion of the parts, which occasions an oozing out of blood, continuing until the wound is healed. The results of dissection indicate that the mischief, in some cases, proceeds from the presence of a species of little worms, of cancer, or of sharp calculus in the kidneys.

TREATMENT.

Moderate bleeding will be beneficial in most cases. Use the whortleberry tea, as prescribed in the last section, and, if any thing more is needed, give a solution of the acetate of potash in half a pint of cold water. In preparing the solution, the proportions will be two drachms of the acetate of potash to four ounces of water. In a very mild case, a few days of rest will sometimes set matters right, without any thing additional.

THICK AND ALBUMINOUS URINE.

In our country, horses are very subject to the annoyance of thickened urine, often of a mucilaginous consistency. In its mildest stages, this affection is characterized by a thick, reddish-brown discharge, when the urine first begins to flow, but changing soon to a more natural appearance, and ending

with a whitish, milky fluid; or, as sometimes happens, the process is exactly the reverse of this. When the disease is further advanced, the urine is thicker and of the deeper tinge at every period of its discharge, and often has an offensive smell. Hundreds of our readers have doubtless seen the case in so bad a form that the urine flowed and fell to the ground like a stream of molasses, and was nearly as dark in color.

The thick, milky discharge resembles that which a few veterinary writers have described under the name of albuminous urine, in which the kidneys secrete an excessive quantity of albumen—the sticky element of the blood, and that which is found, almost unmixed with any other substance, in the white of an egg.

In this condition, there is great difficulty experienced in passing the urine, which the horse seeks to overcome by stretching, straining, and putting out his fore-feet as far as possible. Some stiffness in the hind legs and hips also accompanies it, and occasionally there is some fever. As will now be described, this is one of the agencies instrumental in producing the painful disease which is known as gravel—the formation of calculi, or *stones*, in the kidneys and bladder.

WHITE OR LIMY URINE.

In all urinary discharges, there is a certain amount of calcarious or limy substances, which, if they pass away naturally and without any obstruction, are not prejudicial to the animal's health. Even when these limy secretions are excessive, they do not probably bring on any specific disease, until the urine takes on the albuminous character, mentioned above; and then there is a mechanical union of the sticky albumen and the limy matter, so that the latter is cemented into little balls, or lumps, which continue to slowly increase in size, and, at last, become very painful. As a certain combination of circumstances is necessary to solidify the fine mist of the clouds into the rattling hail-stones, so it requires the presence and action of the albumen to unite the impalpable limy

deposits of the urine into calculi. We have now come to the subject of

GRAVEL, OR STONE IN THE BLADDER.

The latter of these terms is not popularly applied to the disease until the calculi have become of considerable size, and occasion extreme suffering; but this is only an aggravation of gravel.

The origin of this most distressing complaint is to be found in the kidneys rather than the bladder; for, although calculi are oftener found in the latter, it is every way probable that they exist there only as secondary results. According to this view, they are first formed in the kidneys, and, passing to the bladder when still quite small, frequently continue to grow until they attain an astonishing size. Some have been removed from the bladder, by surgical operations, that weighed four ounces. In the human subject, the kidneys are situated almost directly over the bladder, by which arrangement the force of gravity acts to convey the little calcareous mass along the latter. But in the horse the case is different. The passage communicating between the two organs is very nearly horizontal, and the influence of gravity, in effecting the end referred to, is hardly noticeable; hence calculi not unfrequently remain in the horse's kidneys, and do great injury to those organs. In other cases, the calculi pass into the bladder, and, when the urine is voided, are carried by its current into the neck of that organ, and partially or wholly close this outlet, and the stream then flows either very slowly or is suppressed entirely.

We have no certain means of detecting the existence of calculi in the kidneys, and the fact can only be inferred from the scantiness of the urine, when this is not traceable to any trouble within the bladder, and by the general symptoms of renal disease. But when these bodies are in the bladder, they may be readily felt by passing the hand into the rectum and pressing the fingers on the bladder, which lies immediately underneath. This is a sure test, if the calculi are of any size whatever.

The symptoms of gravel are generally very much the same as those of spasmodic colic; but they come on less rapidly, and not so severe, while the horse's actions point to a spot further back than in colic as the seat of his suffering. But great difficulty is manifested in voiding the urine, whose passage is attended with violent straining and groans of distress; and, as before intimated, the irregularities of the urinal flow may even amount to a total suppression. The color and heat of the urine is another characteristic indication. In both colic and gravel the sufferer sweats profusely, but there is more of this about the flanks and loins in the latter disease.

Stone in the bladder is the cause of the most acute suffering. Persons who have been thus afflicted describe their tortures as beyond the power of expression. Even if the passage of urine is not much obstructed, the weight and pressure of such a body within the bladder is a constant source of annoyance and irritation, while its rough and jagged edges may lacerate and seriously injure the delicate membranes of all these parts.

Happily, the farmer rarely has such a case to encounter among his stock; but when he does, he will always find it a most obstinate disease to manage. At best, it will take time to remove the difficulty, which, in severe cases, it will defy his utmost endeavors to do, nothing but a delicate surgical operation offering any hopes of success.

TREATMENT.

We give two remedies, both of which have cured, and both of which have been known to fail—as all treatment frequently must fail in this disease. Our preference, however, is indicated by the order in which we here mention them.

The first is "jimson seed." That this was of great value in cases of gravel, we learned in treating a fine horse, belonging to Mr. Robert McDonald, of Salem, Tippah County, Mississippi. This was a case of chronic distemper, with the

complication of gravel in an aggravated form. "Jimson seed" was employed as an alterative and tonic in treating the distemper, and effectually cured the gravel also.

The dose is an ounce, or large table-spoonful, in the feed, every other day, until the horse is better, or until five or six doses have been given. Accompanying this, prepare and give the following: Four ounces of the spirits of niter, half an ounce of the oil of juniper, and one ounce of the oil of sassafras. Divide this into four doses, and give one of them in the morning, and another at night, for two successive days.

The other remedy is to take a quart of green coffee, and boil it in a gallon of water until the strength is all out, and only about a quart of water is left. Divide this into three doses, and give one dose, with an ounce of spirits of niter in it, every other day.

In an experience of twenty years, we have seen but few well-defined cases of gravel. Four or five we treated, and of these we succeeded in curing all but one. The exception was a mule in most pitiful condition when we first saw him. There had been an entire suppression of urine for a week, and the parts were very much swollen. Whether our directions were strictly carried out we never learned, but we did learn that the animal died.

SUPPRESSION OF URINE.

This painful disorder has already been adverted to as one of the occasional symptoms of gravel, and the presence of large calculi in the kidneys and bladder; but this, although the most common cause, is by no means the only one. The same effect may follow stricture of the urethra, produced by some mechanical injury. The urethra, as the reader will recollect, is the canal extending from the neck of the bladder, and through which the urine is voided. Inflammation and swelling of the neck of the bladder also may obstruct or entirely prevent the urinal flow. From whatever cause it has originated, such a condition is necessarily productive of intense pain.

TREATMENT.

In all cases of this complaint, give the spirits of niter mixture, prescribed in the last section for gravel; but the quantity there specified should be divided into three instead of four doses, of which administer one at morning, noon, and night, in a pint of warm water. If gravel be the cause of the trouble, the niter mixture should be used in connection with the other treatment laid down for that disease. Should there be much swelling of the parts, bathe them well with cold salt and water, three or four times a day.

INFLAMMATION OF THE BLADDER.

In nearly all cases, the existence of this disease is due to gravel, yet occasionally one finds a case of primary inflammation of the bladder. The books call this disorder *cystitis*. The neck is that part of the organ most generally affected, the membranes of its body being involved but comparatively seldom.

There is always a degree of inflammation in connection with gravel, owing to the mechanical irritation of the parts. Aside from this, we know of no other cause for this disease, except the administration of certain poisons as diuretics, conspicuous in the list of which are cantharides and nux vomica. If people will force such substances into the horse's stomach, they deserve to lose their stock. But how can they plead guiltless to the charge of wantonly torturing and destroying those dumb brutes committed to their control by the beneficent Creator?

TREATMENT.

Copious bleeding is the first step in the treatment. Not less than a gallon of blood should be extracted at once. Then give the niter mixture, as directed for gravel. Let the patient have a pint of flaxseed tea three times a day, and, if he will eat at all, set before him only light, soft food—preferably a bran-mash—rye-bran, if it can be procured

Bathe the loins, sheath, and adjacent parts with cold salt and water. In hot weather, use ice, if it can be got.

Let the horse remain perfectly still, or as nearly so as possible. He should have no strong food for a long time, and, unless the owner is willing to dispense with his services forever, there should be a total banishment of moldy hay and fodder from his manger, and only the most sparing use of corn for all the future.

FOUL SHEATH.

A foul sheath is a low-voiced commentary on the neglect and stupidity of the horse's keeper. The number of horses that suffer from this condition—growing poor, sinking into low condition, and sometimes even dying from its effects—is really astonishing; and so, also, is the frequency with which it causes other and serious diseases. Inattention in this regard has nearly, or quite, ruined many an animal for a time, and sometimes permanently.

We have been called to see at least a hundred horses, many of them so reduced as to be "on the lift," when nothing else was the matter; and to the same cause may be traced many cases of stricture of the urinary organs—suppression of urine, bloody discharges, and even inflammation of the kidneys. A horse in this condition will invariably be colicky, for we have good reason to know that the inflammation set upon these parts often extends its influence to the bowels.

The difficulty consists in the collection of lumps of black, waxy substance inside of the sheath and its upper extremity. In some cases, there is only one of these lumps, while in others we have found two, three, or four of them, varying in bulk from that of a walnut to a hen's egg of large size. If these are long permitted to remain, they produce soreness, fever, and inflammation, so that the horse dribbles his water from the sheath. Matter begins forming in time; and it has often excited both our astonishment and indignation to see how blind some owners are when the horse is even in this condition.

We have been called on to examine perhaps fifty poor, broken-down animals, from whose sheaths putrid, offensive matter had been running for months, and the horse was so stiff from its effects that he could hardly move at all; and all this time the stupid attendant "could not tell, for the life of him," what was the trouble.

Foul sheath is intimately associated with fever and disease of the urinary organs, and, in many cases, is caused by them. But it is oftener a promoter of them. Old horses are much more subject to it than younger ones, the mucous secretion which Nature furnishes to lubricate the parts and facilitate their movements being apparently more thick and waxy in old age.

The symptoms will be easily recognized by an observant spectator. The horse does not protrude the penis at all in the act of urinating, but lets the water run out of his sheath. Such an indication invariably points to something wrong in this quarter. There is also considerable soreness of the parts, stiffness of the hips, and a disposition to straddle out the hind legs, in order to give as much room and as free play as possible to the irritated surfaces. When in health, the horse usually throws back the hind limbs and drops the hips, in which position he sometimes makes two or three efforts before the stream begins to flow; but, in the case under consideration, he hardly moves at all, and seems rather to permit than force the urination. The explanation of this is, that every motion and the ordinary contraction of the muscles concerned in this operation necessarily give him pain.

TREATMENT.

The treatment is very simple. The first thing to be done is to clean the sheath. Remove the lumps, if there be any, with the hands; then wash out thoroughly with some clean soap-suds; after which, grease with a spoonful of lard in which has been mixed half as much fine salt. Be certain that this is applied to all parts of the inside of the sheath,

and let it remain until the second day. Now wash out with soap and water, and apply the lard and salt as before. This treatment must be continued until the parts are well, or until the foul smell that communicates to the hand or cloth employed has entirely disappeared.

Bathe the outside of the sheath, two or three times a day, with cold water, if it is in the summer time, but in the winter have the water warmed. If the horse is in quite a bad condition, or has fever, bleed once, taking three or four quarts of blood, and give him plenty of sulphur and resin. Do not work him until he is well again.

COLT FOUNDER.

During the years from 1850 to 1856 inclusive, a remarkable disease prevailed extensively in many parts of the valley of the Mississippi among brood-mares, to which the people of those sections gave the name of colt founder. It always occurred while the mare was heavy with foal, and first showed itself by tenderness and soreness of the loins, accompanied by fever. This soon brought on extreme debility, ending in complete prostration and death. In some instances, a few days sufficed to reduce the sufferer so much that she was "on the lift," while in others the disease did its work much more slowly.

Two out of every three mares thus attacked died sooner or later, and above one-half of these before foaling. If the animal succeeded in giving birth to the colt, she sometimes recovered, but more frequently she died before this took place. We have known a number of colts born when the mothers were so weak that they could not stand on their feet; and, in most of these cases, the offspring were not only born alive, but were raised by hand, and made fine horses. The comparatively few mares that recovered after parturition did so only after a long time, and a large proportion were feeble, and disqualified for service for a twelvemonth afterward.

One feature of the disease, in particular, was well calculated

to arrest the attention of the farmer and veterinarian, and this was that its favorite victims were selected from among the finest brood-mares on some of the best stock farms, and especially those of Middle Tennessee. It was a most painful scene, yet one often to be witnessed, to discover a fine, large, fleshy brood-mare, heavy with foal, lying helplessly upon her side, unable to rise.

No specific was ever found for "colt founder." Various remedies were tried, some of which often gave relief, and at times was undoubtedly the means of saving life. Nevertheless there was nothing which could be relied upon for a cure. The difficulty was not so much to understand the disease as it was to reach it by any adequate method of treatment. This was owing to the nature of the attack, and the peculiar condition of the mare.

Plainly the disease was inflammation of the *uterus*, or womb, involving the organs of production generally, and, in some instances, the kidneys and bladder also. The intense heat of the parts could be readily felt in the rectum; the uterus was terribly swollen and inflamed, often producing *prolapsus uteri* (falling of the womb); and the hinder parts were dreadfully puffed out, making a most unsightly appearance. The effects of the fever upon the urinary organs were clearly manifested by the highly-colored character of the discharges. Except in cases of blind staggers, and possibly a few others of rare occurrence, we have never known so high a pulse, frequently from sixty to seventy per minute.

From examination and treatment of a large number of cases, we came to the conclusion that the trouble was principally caused by overfeeding with corn, and the plethoric condition of the mare. As spring came on, the time of change and shedding the hair, the pressure of the heavy foal upon the vessels, filled with the heated, turgid blood, so obstructed circulation as to give rise to local fever and inflammation. We are convinced that this result was materially hastened by some peculiar epidemic influences prevalent during the years named. The disease was but little known

before that period, and pretty generally disappeared afterward. It was the most common in Middle and West Tennessee, and Northern Mississippi; and, so far as our knowledge extends, no disease characterized by the same symptoms has ever prevailed elsewhere than in those sections, and to a less degree in the territory contiguous. But the periodic recurrence of many epidemics is a fact so well established, that it would not be at all surprising if "colt founder," though perhaps under another name, should again invade the stock-raising districts of the South-west at some future time, and hence we deem it best to detail in full the

TREATMENT.

This we shall give as practiced under our directions in numerous cases. When fairly carried out it will save four or five mares out of every six. It was attended with a greater measure of success than rewarded any other which ever came within our observation.

Bleeding was apparently indicated by the marked symptoms of inflammation and fever, but copious bleeding was extremely apt to bring on an abortion, to cause the mare to cast her foal, and this led us to abandon the practice altogether, as unwarrantably hazardous.

We next resorted to the use of counter-irritants, and found that the corrosive liniment, applied to the loins, produced an excellent effect. That compound, as a counter-irritant, is not excelled by any thing known to the profession. We invariably continued to employ the liniment in subsequent cases.

The next step was direct medication—some prescription to act as a mild diuretic, more powerful remedies operating very badly. For this purpose we gave the following: One ounce of golden seal in a quart of water, which was then boiled well and strained. To this were added two large table-spoonfuls of fine salt, and one ounce of spirits of niter. Three doses were thus made, and one of them was given cold each morning.

Two or three times a day, as much as a pint of cold salt

and water, containing a slight admixture of spirits of niter, was injected into the vagina, and thrown well up toward the uterus. At the same time the clyster of salt and water was freely used in the ordinary manner. We recommend the addition of a small quantity of cream of tartar to the uterine clyster. In warm weather it had an excellent effect to turn bucketfuls of cold water upon the loins.

Chief among the obstacles to a cure was the extreme weakness of the hips. Once down, the sufferer could not get up; and lying out in the hot, scorching sun, the prey of a high, consuming fever, she was sure to die. Another great difficulty to be encountered was the almost entire loss of the use of the hind legs, the limbs becoming more and more numb and stiff the longer she lay upon the ground. It was indispensable, therefore, to build a shelter over her, and at the same time to raise her to a standing position, so that some exercise of the hind extremities could be obtained.

We have seen dozens of the finest mares to be found on the farms in Middle Tennessee, where fine stock abounds, lying on the ground, as some of them had been for weeks, exposed to all the alternations of cold rains, chilling winds, and scorching suns which the season might bring, their bodies and legs nearly eaten up by those torments, the flies, and the ground beaten like a mill-path for yards, from the poor creatures dragging themselves along by the fore-legs and feet. How earnestly have we begged and plead with the owner to do something for the suffering animal! But very often our appeals were met by "the penny-wise, pound-foolish," not to say most cruel, reply that he was too busy; had too much else to attend to, and the sooner she died the better. Sometimes, however, the owners did set to work and raise the patients to their feet, and generally succeeded in carrying them through safely.

The modes of operation adopted in such cases, may be easily explained. One was to set four posts in the ground, about ten feet apart, and of about the same height, and on the top of these to pin strong joists or timbers, the whole

then being covered with planks or boards, so as to form a shelter from the sun and rain. The posts, well braced apart, served an excellent purpose for a sling, substantially the same as that represented by the illustration given in Chapter XXI. The ropes may be carried over the side pieces, and made fast either to them or to strong pins placed on the outside of them.

But a quicker way of raising any horse to his feet, and that which was most practiced in the cases under consideration, consists in building a rail-pen around him. For this purpose, all that is needed, beside the rails, is three strong planks and five or six men. The planks should be not less than one and a half inches in thickness, and at least ten feet long, and they are to be put under the animal's body so that they shall project equally on each side. On the planks should be spread first some hay or straw, and then an old blanket or quilt, or some carpeting, as a pad for the body to rest on. This required especial care in colt-founder, as the belly was very tender and sore. When this has been done, and plenty of rails are at hand, the preparations are complete. There should now be one man for each plank, another to handle the rails, and two to stand at the animal's head and hold him still by the bridle. Let the ends of the planks be raised on one side, and a rail laid under them, about one foot from the ends of the planks, the rail being so placed that they shall be about the middle of it. Then raise the other ends of the planks in the same way. End rails can now be laid on, so as to be ready to raise the planks again. In this way, as the pen is gradually built up, the horse is raised along with it. When part way up, it is very likely that he may struggle considerably, the position in that stage being novel and somewhat uncomfortable; but he must be held by the bridle as still as the two men at the head can hold him, and the pen raised to its proper height as soon as possible. This height, of course, should be such that the feet will touch the ground, and may be rested upon, if the horse is disposed to do so. The rails of the pen must be carried up still higher in front

and behind, and placed close to the hip and breast, so as to prevent the animal from surging back and forth on the planks. Lastly, heavy pieces of timber may be placed on the pen, in front and behind, to hold it firmly, and strong stakes driven down at each corner of the pen, which, by these means, will be so well secured that no movement will be possible. The horse may be hitched by a halter to a post in front, and some planks being laid on the rails at the same place, a platform will be formed on which a feeding-box may be placed.

Such a piece of work will cost the owner perhaps ten dollars, and consume one day of his time; but, besides saving the horse's life, it will be worth fifty dollars in the practical experience gained. The contrivance may be applied in a variety of cases, which most of the farmers destitute of the enterprise necessary for so simple a task, would give up as hopeless from the outset. In cases of broken legs, for example, it can hardly fail to preserve the horse's usefulness unimpaired.

But to return to the treatment of "colt founder," particularly. The mare having been raised by means of the rail-pen, a good shelter should be fixed over her, and if before foaling, preparations may be made for that event. In a majority of cases, however, such extreme weakness does not occur until after the birth of the colt; and even though it should, if that period be very near, it may be best to defer raising the mare until after foaling.

There being no longer any danger in regard to abortion, bleeding may be resorted to without fear, to abate the inflammation. The food should be very light, soft, and relaxing. Green grass should be cut and placed in the feeding-box, and quantities of sulphur and resin should be given. If there is great costiveness, so that the dung is hard, dry, and black, two or three doses of "jimson" seed will be the proper remedy. On no account, however, is this to be given until after foaling, as its use before that time is dangerous.

If the animal is in the stable instead of out in the field,

all the operations we have here described may be carried out there.

DISEASES OF YOUNG COLTS.

Perhaps we can find no more appropriate connection than this in which to consider certain diseases that sometimes attack the young colt. They were especially prevalent in the stock-raising districts of Tennessee during the same period that colt founder was so common there—from 1850 to 1857. In these cases, the colt, sickening in a few days after foaling, was apt to prove but a short-lived addition to the farmer's stock. The mule colt shared equally with the horse colt in the mortality.

These diseases are of two distinct classes: first, those of the bowels, which include both costiveness and looseness; second, those of the urinary organs, which were suppression, increased flow, and bloody urine. Suppression of the urine is sometimes caused by mechanical obstructions, as will be mentioned when we speak of the treatment; but, with that rare exception, the origin of all these troubles may be traced to the condition of the mother at the time of foaling, and, subsequently; for the quality of the milk which the youngster begins life upon is to him a matter of vital consequence.

We have before noticed the highly injurious results which follow the use of such feed as the unsound corn and moldy fodder that constitute a great part of the diet of thousands of horses at the South. It is a matter that involves the causes of big head, blind staggers, all manner of digestive and urinary disturbances, and we know not how many evils besides; but the dire category would be singularly incomplete if these complaints of the young colt were left out of it.

It is impossible for the mother, fed on such substances, not to impart her unhealthy condition to the colt. It does not always follow, however, that each will have precisely the same disease as the other, and much less in the same degree. The rule can scarcely be carried further than that if the

mother is unhealthy, the offspring will be unhealthy also. Each may have disorders that the other entirely escapes.

But corn, though the best grown, is not the feed for a mare suckling a young colt. It is too strong and heating, and forms a quality of food not suited to the needs of the foal. So, although the mother remains in scarcely impaired health, he may be the victim of obstinate costiveness, or the most troublesome scours. The difficulty would have no existence had the mare been fed on proper diet, and judiciously cared for in all other respects. The case is the same in regard to the other class of affections. Although the urinary organs of the mare may suffer to some extent, the superior strength of her system enables her to bear up against the unhealthy influence, and may even enable her to throw them off almost entirely; yet the tender colt succumbs more readily, and suddenly the owner discovers that the young animal is very ill, and suffering acutely. Stricture, suppression, diabetes, bloody urine, are the various developments of disease having one uniform origin.

TREATMENT.

The treatment will prove difficult, as it is very dangerous to give medicine to the young colt, and he may be seriously injured, if not killed outright, by injudicious drenching. In this case, all the medication attempted should be through the milk of the mother, and the clyster alone given the colt. If the bowels are constipated, an aperient given the mother will affect the colt nearly as quickly as it does her. In this case, give the colt a clyster of salt and water, as warm as he can bear it, with a small quantity of aloes added; or some warm soap-suds may be used for the same purpose.

In "scours," as it is called, neither through the mother's milk nor to the colt will it answer to give much astringent medicine. A little of the blackberry-root tea may be administered to the mare. As a clyster for the colt, it will be best to use fifty drops of laudanum, with one-fourth of an ounce of Epsom salts, dissolved in water; or a little salt and

water, cold, with a slight infusion of golden seal, and a table-spoonful of finely-pulverized charcoal. If an astringent medicine be given the colt, some mild aperient should accompany it, or extreme costiveness, with fever, will be the result.

The urinary difficulties of the colt are not so readily managed. When there is suppression of the urine, examine the parts to see that the trouble does not arise from mechanical causes. In a few cases, the outlet at the end of the penis will be found sealed, perhaps, so that no urine can possibly force a passage. If this is caused by a scabby incrustation, wash off the part thoroughly, and there will be relief at once. If there appears a skinny covering over the outlet of the urethra, cut an orifice through it with the point of a sharp knife. Stricture of the neck of the bladder from inflammation is the only other cause of suppressed urine that can be positively indicated in regard to the colt, as we have no knowledge whether his kidneys are diseased or not. In treating this, it will tend to relax the parts to apply hot salt and water to the outside, and to inject some of it into the rectum; and, at the same time, half an ounce of spirits of niter may be given to the mother each day, in some warm water.

Bloody urine in the colt we have found to prove fatal, almost invariably, from the fever and inflammation that was set up. We recommend bathing with hot salt and water; a clyster of the same, except that it should be cold, and some spirits of niter given the mother.

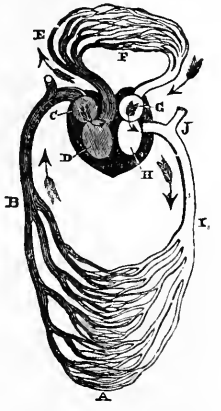
Perhaps all these cases of disease might be remedied, and generally prevented, by proper attention to diet during the time that the mare is with foal, and afterward until the period of weaning. For the benefit of the young colt, the food of the mare should be changed at once. If he is costive, give her relaxing food, such as bran—preferably, rye bran—or, still better, green, succulent grass. If he has the scours, feed her on good light hay, and clean, pure oats. Here, as every-where else, the rule is, a dry diet for scours, and a

moist one for costiveness. Whether for derangement of the bowels or of the urinary organs in the colt, give as much sulphur and resin as the mare will eat. In cases of bloody urine, if the colt has fever, bleed the mare, and that will be equivalent to bleeding the foal.

CHAPTER XV.

DISEASES OF THE HEART AND BLOOD, ETC.

THE accompanying cut is, of course, imaginary, but it admirably conveys to the mind, through the eye, the general plan of the circulation as it exists in man and all the higher types of animals. Both the general and the pulmonary circulations are here represented. It will well repay the reader not thoroughly familiar with at least the outlines of anatomy and physiology, to turn back to Chapter II, and carefully go over the sections on the blood-vessels and the heart, in connection with this illustration. By this means he may permanently fix in his memory some of the most important facts and principles, that are taught in the entire range of the two sciences referred to.



PLAN OF THE CIRCULATION.

The arrows indicate the direction in which the blood flows in the different vessels. Those of the latter, which convey the pure or arterialized blood, are indicated by the absence of all shading; and those which convey impure or venous blood are represented by heavy shading.

A, Capillaries on the general surface in all parts of the body, forming the intricate net-work of minute vessels by which the veins and arteries are connected.

B, One of the vena cavæ, which are the two great veins through which all the venous blood in the body is finally returned to the right auricle of the heart.

C, The right auricle, from which the venous blood passes into the right ventricle.

D, The right ventricle, from which the venous blood passes into the pulmonary *artery*.

E, The pulmonary artery, which carries the still impure or venous blood to the lungs.

F, The capillaries of the lungs, spread out over the immense extent of surface

afforded by the air-cells. In these the blood is purified, by the processes of *decarbonization* and *oxygenization*. They unite and form the pulmonary veins, one of which is indicated in the cut, near the uppermost of the downward-pointing arrows, but is not lettered.

G, The left auricle of the heart, which receives the now purified, or arterialized, blood from the pulmonary *veins*, and from which it passes to the left ventricle.

H, The left ventricle, the contraction of whose powerful walls forces the blood out through the aorta and the successive subdivisions of the arteries to all parts of the system.

I, The *aorta posterior*, dividing and subdividing into smaller arteries, which finally unite with the capillaries at *A*, where begins once more the venous circulation. The aorta posterior is the great artery which supplies the abdomen and all the hind extremities with blood. The latter is now freighted with nutrition extracted in the intestines from the food, and conveyed into the general circulation through the *thoracic duct* (not shown in the cut) and the *anterior vena cava*.

J, The trunk of the *aorta anterior*, the great artery which supplies the contents of the thorax, or chest, and all the fore extremities, etc., with the pure and nutritious blood. It ramifies and terminates in the same manner as the aorta posterior.

DISEASES OF THE HEART.

The causes and symptoms of this entire class of diseases are very obscure. Perhaps *hypertrophy*, or enlargement of the heart, is the most common affection. A Mr. Thomson, of Bath, England, several years ago, contributed to veterinary science the history of a singular case, in which the heart became "a large disorganized mass, weighing thirty-four pounds." Other cases have been reported much nearer home; but hardly any thing seems to be known respecting the disease, beyond its simple existence. Of course the process of growth must be going on for some time before it kills the horse; yet there are no certain means by which the existence of such a condition can be detected. If the action of the heart be seriously obstructed, the animal must die at once, and a comparatively slight derangement would occasion acute suffering. In many, or perhaps nearly all, cases of death from this disease, the heart seems to have performed its usual functions, without noticeable disturbance, up to the very moment of its entirely ceasing to beat.

In regard to any other disease of the heart, we must con-

fess entire ignorance. Among the hundreds of horses that we have examined and dissected, we have never discovered any preternatural symptoms in the tissues of that organ. It is only fair to say, however, that these examinations were directed to some other end than critically investigating the subject of heart disease.

Youatt enumerates eight different diseases of this class, and attempts to give specific symptoms in each case. But we see no essential differences in his descriptions of them, save merely in their verbal arrangement. He makes no pretensions to giving any remedy for them. Hardly any other recognized authority makes any mention of the horse suffering from heart disease.

Although it is quite reasonable to suppose that so vital a part of the animal's organism may be the seat of various disorders, it will be of no consequence to the farmer to spend much time in considering the subject, unless some remedy can be suggested; and as this is beyond our power, we may as well dismiss the whole matter and pass on to something else.

THUMPS.

This is a not uncommon disease in many sections, having its origin, not in the heart, yet very near it, in the pulmonary artery. (See *E*, in preceding cut.) It is a cartilaginous enlargement of the walls of that vessel, so that the channel becomes diminished in size, and can not pass the same quantities of blood that it does in its healthful state. When it is considered that every drop of blood in the entire circulation is propelled through this main duct, on its passage from the right ventricle of the heart to the lungs, there to be arterialized or purified, it becomes apparent, at once, that any obstruction of the pulmonary artery must cause serious disturbance in the heart, whose contractions are the power that forces the blood along this channel.

The pulmonary artery, like every other in the body, is composed of three distinct coatings—the outer, or peritoneal; the middle or muscular; and the inner, or serous. Its

walls are very elastic and flexible when in their natural or healthy state, and expand, to some extent, at every pulsation. But it so happens that they sometimes become grown together and hardened, in which condition they do not admit the flow of blood so freely as before. Ordinarily, no disturbance is noticeable from this change in the coatings of the artery. The duct still appears to be sufficiently large for the passage of the blood, until the horse is severely exercised, or otherwise excited; and then the blood courses through its channels with such increased rapidity that the diminished capacity of the pulmonary artery is found to be a serious trouble. The vessel does not respond to the growing demands upon it by the heart. The blood now begins to accumulate in the heart, compelling that organ to put on extra labor to urge it forward through the unyielding artery; and this labored action of the heart often becomes so great that the other arterial channels sympathize with it, and a general throbbing of the internal viscera is the consequence. This throbbing may be plainly seen upon the sides and flanks, and hence the appropriate, though homely, name, thumps. When the excitement passes off, and the blood becomes cooled, and the system tranquilized, these throbbings subside again.

Thumps affects some horses much more than it does others having the same difficulty, probably from the pulmonary artery being more constricted in such cases. Occasionally it kills the horse. The whole heart sympathizes with, and partakes of, the disease of the artery, and inflammation is set up, or stricture of the artery takes place. In the latter event, the blood is suddenly stopped, and the horse falls down dead.

We were once driving a very large, fleshy mare, in a buggy, upon the turnpike leading from Pulaski to Columbia, Tennessee. The day was excessively hot. When about midway between the two places the mare had an extremely severe attack of this distressing complaint. So violent were the thumpings, that it seemed as if her very sides would be torn asunder. We were compelled not only to stop and rest, but to unhitch her from the buggy. Such terrible throb-

bings, amounting almost to convulsions of the sides, we never saw elsewhere. Prospects were very fair for staying there the remainder of the day, until a fortunate idea suggested the simple but admirable remedy which will presently be prescribed under the head of Treatment. Eight quarts of water, from one of the many cold lime-stone springs of this region, with a handful of salt stirred in, were given her, and greedily drunk. In thirty minutes all was as tranquil with the animal as if nothing had happened, and we went slowly on our way rejoicing.

In about a year from that time, this mare died very suddenly, as we afterward learned, undoubtedly from the diseased condition of the pulmonary artery. She had been subject to these spells of thumps for a number of years previous.

TREATMENT.

The treatment can not be expected to prove really curative; the changed structure of the arterial walls can not be corrected by the skill of man; but relief may readily be given in an attack of thumps. Bleeding will accomplish this almost instantly, by lessening the flow of the blood; but it must be an extreme case, indeed, in which this can become necessary. It is to be tried only as a last resort.

Any thing given the horse to cool his blood will cause the thumps to subside. Ice-water, with a little salt in it, just enough to make it palatable, as well as to prevent it from bringing on an attack of colic, will give relief in a few minutes. This is recommended as the best and safest treatment. It is astonishing with what avidity a horse in this condition will drink the cold water, and that, too, with a pretty good sprinkling of salt in it. All that he will swallow can do him no harm. If the ice-water can not be procured, the coldest water that can be will answer very well. The cessation of the thumpings is only a question of time, in nearly all cases, and sometimes an hour or two of rest in the shade will set every thing to rights again.

Blue stone, dissolved in spirits, has often not merely given

relief from a severe attack, but has seemed to abate the symptoms of the disease for a considerable time afterward. The best prescription of this sort is the following: Two ounces of blue stone, the same of asafœtida, and the same of "jimson" seed—all to be pulverized, and then put into one pint of good spirits. Divide this into six doses, and give one each day in a pint of warm water.

We have seen hundreds of cases of thumps at the South, and have treated a considerable number. We have bled in some instances, but of these cases only two or three do we now think needed bleeding.

SCROFULA.

Before passing on to an examination of the causes and phenomena of fever, or inflammation of the blood, we wish to consider briefly the question whether the horse is a scrofulous animal.

We know that the body of the hog is filled with scrofulous ulcers. They are found in his liver, lungs, mesentery, pancreas, diaphragm, intestines, and pleura; on the heart, also, and on the walls of the ribs, the fat on the sides, and even on the legs. No hog, probably, lives or dies without having scrofulous ulcers and tubercles in some of these organs. Cattle are similarly affected, though in a much less degree. Tubercles have been found in both the liver and lungs of the kine. Sheep are scrofulous, and decidedly more so than cattle. Of other animals, we have no positive knowledge, but there are indications which lead us to believe that many of them, at least, have been made subject to the same taint. Is the *horse* a scrofulous animal? We believe that he is. What mean those ulcers on the liver, those tubercles in the lungs, those tumors in the glands, if such is not the case?

In hogs, sheep, cattle, and horses tubercles and ulcers occur in precisely the same localities as those which exhibit scrofulous ulcers in the human being. The lungs and the glands of all these are found, on examination, to have the same structure and functions. The affections of the class we

are considering appear the same in all of them, being eruptive in the glands, consumptive in the lungs, and ulcerous in the liver and bowels.

"Man hath no preëminence over a beast; as the one dieth, so dieth the other." May not this have reference, not merely to the manner, but to a universal cause of death—something to which all flesh and blood are subject? We are well aware that this is delicate ground for the pathologist, yet have long entertained the opinion that the whole animal creation was, to some extent, affected with the virus of scrofula, insidiously diffusing its poison and scattering the seeds of disease universally. The horse we believe to present indications of a decidedly scrofulous character; hence the benefit of alteratives, by which, in connection with bleeding when the symptoms warrant it, the blood may be purified, its subtle poisons neutralized or destroyed, and its qualities changed, so as to make it fit for the support of a healthy and vigorous life.

We have often recommended to the reader's favor the "jimson" seed of the farmer, the *datura stramonii* of the schools, and here desire to repeat the statement that, in our judgment, no other alterative which the veterinarian can give will produce equally beneficial results. It is invaluable in farcy, distemper, hide-bound, mange, surfeit, stiff complaint, big head, and numerous other diseases. It greatly assists the digestive process, changes the character of all the secretions, eliminates the offensive matter from them, and gives tone to the entire system. The dose is one table-spoonful, or half an ounce of seed, given every other day, in the horse's feed.

FEVER, OR INFLAMMATION OF THE BLOOD.

The blood is not to be regarded as the seat or fountain of disease; yet there is hardly an ill to which horse-flesh is subject that does not affect it to a greater or less extent. It is itself first filled with the virus of disease, which it then carries to all parts of the frame.

Fever is an inflamed condition of the blood, which has be-

come overheated by local or general irritation in the system. Some part is cut, bruised, or injured in some way; some lesion of muscles, tendon, or membrane has taken place; some bone is broken or nerve impaired; some dreadful exposure to cold has made the whole body sore; in some way, and from some cause or other, a certain organ or part has received injury, so that it is weaker, more frail than the others. It suffers increasingly from this injury, and becomes more sore; irritation and heat are here augmented, and fever arises. The most familiar sources of heat are combustion and friction. Animal heat is principally evolved by a process essentially the same as the former, while it is the latter which generates fever. Fever heat is the result of the friction of the blood, surcharged with the heat from the injured and, presently, inflamed part. It is not that the blood heats the part, or even itself, but that the inflamed and heated part heats and inflames the blood.

It is a principle laid down in Chapter I of this work, among the important facts to be remembered in treating diseases of the horse, that nearly all disorders of both man and beast, whatever may have been the primary or external causes, proceed from obstruction and derangement of the circulatory and secretive functions. Such obstructions are nearly or quite always caused by injuries of some kind. These may be local or general, but wherever they produce obstruction, there will heat and fever be found.

The shoulder is sprained or bruised, and a tumor arises, marked by swelling and great heat. From whence comes this increased amount of heat? Certainly not from the blood. Had not the part been injured, the blood would have kept on flowing, as it had been doing from the moment of birth, without the development of any extra heat. This must clearly have its origin in the obstruction. Some of the blood-vessels and many of the little capillaries have been injured, or perhaps even broken, and their contents are now discharged into the surrounding tissues. Here begins obstruction, interruption of the circulation.

If any one asks, But what causes the heat? we answer, friction of the circulation in the injured part. The flesh has been crushed and mangled, and, when Nature endeavors to force the current of circulation through these disjointed, broken channels, there is an extra amount of friction, and extra heat is the result. Even the flow of water through a pipe abounding with angles is attended by an appreciable rise in its temperature. In the animal system not only are analogous causes now in operation, but there is increased muscular contraction to overcome these impediments to circulation, and muscular exertion is always accompanied by the evolution of heat.

If the circulation could be either suspended or carried forward regularly, there would be pain, but no extra heat. When a little abnormal heat is generated, its influence upon the neighboring secretions and circulation is like the burning of the wick in the lamp. In accordance with the same physical law by which the oil rushes to the consuming flame do the blood and watery secretions move toward the injured, heated part; and, as the tendency of the flame is to ignite all the combustible material surrounding it, and would do so unless prevented, so the heat of the injured part spreads and increases until the whole system is involved and on fire with fever heat. It is like the burning of dry wood—a little flame and a little heat at first, but how soon is the whole pile on fire!—a small beginning, a little heat in the injured parts at first, but how soon it spreads through every portion of the frame!

This we believe to be the true theory of fever. The blood is not the generator of heat, but simply the conductor of it from the burning fountain at the injured spot to all other regions through which the blood ramifies.

Now, what are the plain, logical inferences from all this? Two principal ones are all, perhaps, that practically concern the farmer. The first is, to prevent the fire from burning at all, if this be possible; to allow it no start whatever; to protect the house from sparks and fire-brands. Let there be no oc-

casion, which prudence and foresight can guard against, for fever and heat to arise. Adopt for the habitual rule of action the old and homely, yet most excellent adage, that "an ounce of prevention is worth a pound of cure." Forestall disease, and no encounter with it need be anticipated. In this department there is great room for improvement on the part of our farmers. It should receive a greater share of thought and investigation. Its intelligent study, and a uniform practice in harmony with its laws, would well repay every man who has any thing at all to do with the care of stock.

If the minds of those having the charge of horses could be aroused to the fact that three-fourths of the ills which befall overworked and ill-treated horse-flesh in civilized communities was due to neglect and mismanagement—to exposures, deprivations, and abuses—what a vast aggregate of suffering might be prevented, and how great pecuniary advantages might be secured! Our farmers should be reading men, thinking men—men of intelligence and broad culture. They should be reformers of abuses and instructors of ignorance; and even if they were men of science it would not do them a grain of harm. They should seek to learn the best systems of management, and practice those only. They should study the laws of health and every thing pertaining to the sanitary condition of their noble servant, the horse, and make their treatment of him conform to the knowledge thus acquired. When this becomes the case generally, instead of exceptionally, as at present, the horse will be freed from disease to an extent that probably few would now deem credible.

That man who is ignorant of the physiological requirements of his horse, and of the pathology and treatment of the animal's diseases, is to be pitied when his horse is taken ill. He is in the predicament of a man whose house is on fire, and he trying to put out the flames. Poor fellow! his is a difficult task. Better, a thousand times better, that he had never allowed the fire to get under way at all—had pre-

vented it altogether. How many a farmer and horseman there is in the land who never knows when his horse is on fire with fever and disease until the case becomes utterly desperate, if not hopeless, and who has not the remotest idea of how to manage to prevent the attacks of disease which are always lying in wait to avenge any enforced violation of Nature's laws by his poor, dumb servitor. When the horse of such a man is taken ill, the symptoms of the case are pretty sure to argue to the better-informed observer carelessness and neglect, if not downright cruelty, on the part of the owners.

The second inference to be drawn from the facts laid down in expounding what we consider the true theory of fever is, that if disease should make its appearance, it should be attacked at once, and vigorously. No time ought to be lost. The first stages—the development of the earliest symptoms—indicates the period for beginning energetic and intelligent treatment. As in the case of the fire, so it is here—a little blaze may be put out with trifling exertion, but if this be neglected, a conflagration may ensue beyond the power of hundreds to arrest. Thousands of horses—and, for that matter, thousands of people—die yearly that might be saved if treatment was soon enough begun.

TREATMENT.

The successful treatment of fever embraces three distinct considerations—the organ or part diseased; the blood, which spreads universally the influences arising in the diseased part; and the capillaries and pores. From the first of these it is our opinion that all fever proceeds. We may not always be able to find the affected organ; but it exists, and upon our success in finding it greatly depends our chances for curing the fever. For the many failures to cure fever two principal causes may be assigned; namely, ignorance in respect to the primary location of the disease—the part where the prevailing fever and heat have their origin—and ignorance of the proper remedy after the nature of the disorder

is fully understood. Oftener than otherwise, the trouble lies in the former.

An effort to free the blood from fever, while there is a fountain somewhere in the system pouring out its influences of heat and inflammation, will prove fruitless in the end. All such treatment must necessarily fail; the fountain must be dried up, or the stream will continue still to flow. We may ameliorate symptoms, but until the cause of disease is discovered and removed, there can be no permanent cure.

We have, therefore, no specific treatment for fever, nor any directions, save those which are given in connection with the disease of which the fever is the symptom and development. In general terms, alteratives are of great benefit as both preventive and corrective of a diseased condition of the blood. Some of them accomplish wonders in aiding the vital forces to resume their full, free, and healthy action. Next to the "jimson seed"—even better than that in some diseases—we must give the highest excellence among all alteratives to the sulphur and resin compound, so often prescribed in the preceding pages of our work. It acts somewhat slowly, but always surely, and can do no harm, no matter in what quantities the horse will eat it.

But it often occurs that the horse's blood is in such a state, and the whole system of absorbents rendered so inactive, that alteratives can not be thrown into the circulation with sufficient rapidity to produce the desired effects; and here frequently arises the necessity for bleeding. Before considering this subject, however, let us inquire what changes disease may work in the blood, and what that state of the blood is in which bleeding becomes proper.

THICK BLOOD.

This is a condition of the blood often found in venesection. The blood is so thick that it scarcely runs at all for some time, though the large vein of the neck—the jugular—has been opened with a broad-shouldered fleam or a large

lancet, and the neck has been corded. Such a thickening of the blood is due to the influence of fever. It has become sticky; it moves sluggishly in the veins, and is no longer the life-sustaining, strength-giving fluid that Nature designed it to be.

Such blood is very dark in color. In those diseases that involve the general system, it is astonishing how thick and dark the blood becomes. In cases of big head, for example, we have often found the blood of a tinge even deeper than a dark brown—in fact, almost black.

This condition of the blood is attributable to fever, and is always a feature in fistula, distemper, glanders, farcy, chronic founder, hide-bound, mange, and in some of the diseases of the lungs. Its existence, with very rare exceptions, is indicative of the propriety of bleeding, and generally of its absolute necessity.

THIN BLOOD.

There are some diseases, producing little or no fever, that have a tendency to make the blood too thin and watery. Such are the "scours" that affect many horses, diarrhea or dysentery, and other diseases that waste away the body by continued defluxions. Affections of the urinary organs belong to this class. Consumption, also, disorganizes the blood, making it thin and light.

The blood, as was explained in Chapter II, is made up of *coagulum*, or clot, and *serum*, or watery fluid. In disorders of the kind we are now considering there is a deficiency of coagulum, which is the component that gives the blood its red color; and, from the excess of the thin, colorless serum, the blood becomes pale and watery. In such cases, the horse, instead of being bled, needs the most generous diet and treatment, in order that more and richer blood may be made and thrown into the feeble circulation.

BLEEDING.

Physicians, in treating the human subject, have almost dispensed with phlebotomy as unnecessary, and tending to

deplete the system and weaken the vital energies. We do not care to dispute the correctness of their practice in this regard, but when the same theory is advanced in respect to the horse, we know that it is not applicable. A few pseudo-veterinarians have advocated it, we are well aware, and they have poured forth unnumbered vials of wrath, and subjected the people's English to no one knows what torture, in their denunciations of the "vile practice" of bleeding, as they are pleased to characterize it. One "modern horse doctor," in particular, claiming the benefits of an experience of nine years' practice in the vicinity of Boston, informs us that "the disease can, if curable, be cured without abstracting blood. In every disease where bleeding has been resorted to, complete recovery has been protracted, and the animal manifested the debility by swollen legs and other unmistakable evidences of derangement." His other argument is, "Because the letting of blood impoverishes that which remains, and leads to other equally dangerous diseases as the one it was intended to cure."

Now, all this is simply *not so* in relation to the horse; and, in passing to its examination, we can not help remarking how little support this writer's theory is likely to derive from his own experiences as recorded by himself in the same volume. We believe that he has not told us of a single cure that he has effected. He went to see several bad cases, it is true, but these all died; and as for the others, one can hardly help being led to believe that they died also, or else that, if they got well, they would have done so just as soon without his assistance. His work either entirely ignores or contains gross inaccuracies concerning some of the most dreadful maladies to which the horse is subject. While some diseases, and they among the worst known, he barely mentions, for others he has prescribed as many as twenty-two or even twenty-eight different ingredients in compounding a remedy. Some of his preparations it requires fourteen or fifteen days to make ready for use!

With our own hands we have bled five hundred horses and

mules, and in no case found any of the evil consequences to follow that are indicated in the quotations above given. Thousands of animals have been bled for big head alone, to our certain knowledge; and we know that neither the "modern horse doctor" nor any one else can cure that disease without a resort to the "vile practice." There are other complaints in whose treatment it is equally indispensable.

Bleeding, if judiciously performed, does not necessarily "impoverish the remaining blood." In nearly all cases where bleeding is proper, the blood is already impoverished by disease, and, if it were not so, the horse would be well. It is thick, dark, and greatly deficient in the nutrition which the system requires for its support and growth. To say that the horse would be better off without any of it in his veins would be pushing the argument to an absurd extreme; but the statement is within perfectly reasonable bounds that it has become only the vehicle of disease and deterioration to the different tissues of the body.

But this is not the only or the chief difficulty. The capillaries—those little channels which ultimately convey the nutrition imparted by the food to the entire organism of the body—have become obstructed, and perhaps closed, by this very same condition of the blood; and muscles, tendons, membranes, bones, skin—all parts of the frame, in fact—are suffering and wasting away. There must be a removal of the cause if the results would be altered. The blood must be changed and purified; new and better blood must be substituted for that which is impure and impoverishing.

How is the blood to be operated upon when it is in this state? Whatever is done now must be done quickly. The whole system is fearfully disturbed, and, unless the natural functions are restored to their healthful action speedily, the animal must die. Will medication do this? Rarely, indeed. The medicine may distend the stomach to its utmost capacity, and the blood scarcely be influenced by it. In this condition of the blood, communication with the alimentary canal, whence it receives all its supplies, is closed to an alarming

extent, so that neither food nor medicine is taken up by the lacteal absorbents in nearly the quantities that they would be if the body was in health.

It is folly, then, to lay such stress on that flimsy web of argument, the impoverishment of the blood by bleeding. The blood is already impoverished, disorganizing, decaying, and the sooner it can be replaced by what is new and healthful the better.

This leads us to another and very important consideration; namely, the certainty and swiftness with which bleeding relaxes the system—in numerous cases doing at once what medicines will not do in time to save life. As consequences of this relaxation, the absorbents of the bowels are opened, and the secretions throughout the body are eliminated more nearly as in health.

In respect to bleeding, it will not do to consider the case of the horse exactly analogous to that of the human being. Although the physical organisms of man and of the horse are so much alike, there exist some marked diversities when we come to the minute applications of hygienic laws. All medicines do not have precisely the same effect upon both of them. Some which act with great severity upon the horse are almost inert upon the human subject; while others that are poisonous to the latter are mild and gentle, or quite inoperative, when given to the horse. Our liniments are examples of the first. They produce comparatively little effect upon the skin of the person handling them, while they act most powerfully upon that of the horse. Of the second class, the *datura stramonii* is a remarkable specimen. Although it is a rank poison to man, a gallon of it would not hurt the horse. We have known him to almost live on it for two months, in that time eating bushels of the leaves and buds.

Not a few cases of bleeding have we witnessed in our time from the human subject, but have never known such blood to be drawn as we have seen flowing from the jugular vein of the horse—thick, sticky, and almost black. From him we have abstracted, we might almost say, hogsheads of blood,

and rarely, indeed, without witnessing marked and speedy improvement afterward. The object of bleeding is to relieve the circulation of impure, diseased blood, and to relax the system generally; and, in this condition, medicines may be administered to some purpose. Its tendency is not to debilitate in those cases where the horse's system is already prostrated, or greatly deranged by disease of such character as to render bleeding proper. For example, we have taken a horse with big head, time and again, when he was so stiff and weak that he could not get up without help, and, in a very few days after bleeding, have seen him rise to his feet by his own strength, and continue to grow stronger and stronger until quite well.

Some persons have a zeal without knowledge, and, in their haste to assume the character of reformers, do not stop to weigh facts with due care, or to test new theories by actual experience. We are as much in favor of improvement as any one else, but we want it to be in the right direction. No arbitrary views should be clung to in the face of an overwhelming array of facts upon the other side of the question, simply because they constitute the distinctive policy of one's self or of any other person whatsoever. We would gladly dispense with the trouble of bleeding, if it were not necessary for the cure of the diseased horse. The system of bloodletting was undoubtedly abused in former times, but that is no argument against its practice on the proper occasions. Those occasions are not seldom, or difficult to distinguish. Many of the horse's diseases it is impossible to reach effectively in any other way.

Our views upon this point are in harmony with those of the best talent whom this subject has ever engaged. We are in excellent company in this respect, in support of which position let us quote the opinion of that unsurpassed authority in veterinary science, William Youatt, than whose judgment, in this important matter, no man's is worth more:

"If inflammation consists of an increased flow of blood to

and through the part, the ready way to abate it is to lessen the quantity of blood. If we take away the fuel, the fire will go out. All other means are comparatively unimportant, contrasted with *bleeding*. * * * It is a principle in the animal frame which should never be lost sight of by the veterinary surgeon or the horseman, that if by bleeding the process of inflammation can once be checked—if it can be suspended but for a little while—although it may return, it is never with the same degree of violence, and, in many cases, it is got rid of entirely. Hence the necessity of bleeding early, and bleeding largely, in inflammation of the lungs, or of the bowels, or of the brain, or of any important organ. Many horses are lost for want or insufficiency of bleeding; but we never knew one materially injured by the most copious extraction of blood in the *early* stage of acute inflammation. The horse will bear, and with advantage, the loss of an almost incredible quantity of blood. Four quarts taken from him will be comparatively little more than one pound taken from the human being. We can scarcely conceive of a considerable inflammation of any part of the horse, whether proceeding from sprains, contusions, or any other cause in which bleeding, local (if possible), or general, or both, will not be of essential service."

As before stated, it is not necessary to bleed in all diseases. The operation is to be resorted to only in cases of acute inflammation and old chronic complaints. To prevent mistakes, we give the following rule: If, when the vein is opened, the blood flows freely from the first and looks red, with but a slightly dark tinge, close the vein at once—the horse does not need blood-letting. Never bleed to improve condition, but only to attack disease. If your horse is sick, you can seldom go amiss to bleed him, unless his disorder belongs to the class referred to a few pages back, that waste the system away by constant defluxions. We only recommend bleeding in cases where experience has taught us its necessity, where the blood is in a diseased, disorganizing condition, and free communication between it and the alimen-

tary canal—its source of nutrition—is in great degree or entirely suspended.

The *amount* of blood to be taken at any one time will depend upon the violence of the attack, or the length of time which the disease has been running. It will be very seldom that the practitioner will find it judicious to take more than four quarts at a single bleeding, and from this the quantity will diminish down to a quart, in case of extreme weakness or a mild attack. In sudden attacks of inflammation, copious bleeding will be necessary only once, as a general rule. In chronic or constitutional diseases, it may be necessary to bleed oftener, but not so much should be taken at one time. Big head, bide-bound, mange, fistula, chronic founder, and some other disorders, make the blood very black, and here the stream should be kept running until its color changes to a healthy venous color—somewhat darker than arterial blood, but still a beautiful red. In cases of lock-jaw and blind staggers, the vein must be kept open until the pulse falters, the knees begin to tremble, and the horse commences to blow.

The proper *place* to bleed is in the neck vein—the jugular vein, as its proper name is—about two inches down the neck, from where the two branches of the vessels unite. It is a little below the point indicated at *t* in the cut at the beginning of the next section.

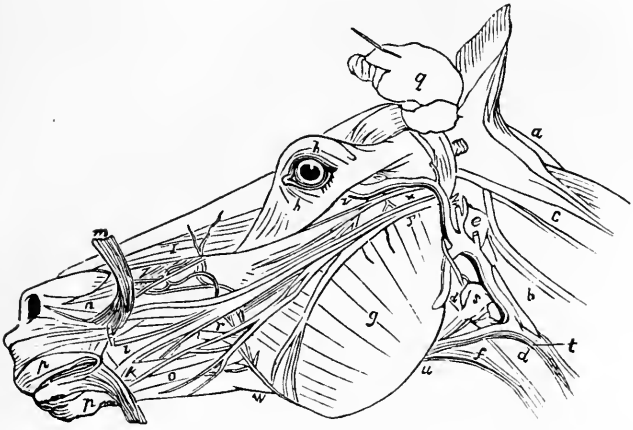
We will now describe the *manner* of bleeding in the way that most horsemen will practice it, not being supplied with a lancet, which is a matter of no consequence. The operation is so simple that no farmer, or intelligent lad who is intrusted with the care of a team, need have any fears about undertaking it, if his mind has once been conclusively made up in relation to its necessity. A small, hard cord should be drawn tightly around the neck, about six inches below the place where the incision is to be made, and, as soon as the neck fills out, smooth the hair with the moistened finger, so that it may lie close and straight with the vein. Then have some one to hold the horse; cover the eye on the side whence the blood is to be drawn, or, if the operator is alone, the horse may be

blindfolded. Now lay the fleam lengthwise the vein, holding it in the left hand, and resting it exactly on the center of the vessel, and, with a hard piece of wood in the right hand, strike the fleam with sufficient force to cut into the vein. The piece of wood used for this purpose should be about a foot long, and an inch or more in thickness. The blow given with it must not be so violent as to cut through the inner wall of the vein. Such an accident has sometimes occurred, and is apt to result in inflammation of the parts, and the formation of an abscess back of the vein, which will prove exceedingly difficult to remove. The incision should be large, so as to secure the abstraction of the requisite amount of blood in the shortest time possible; hence the advantages of using a broad-shouldered fleam. After enough blood has been drawn, remove the cord from the neck, and the blood will cease to flow. Now bring the edges of the cut together, and put a quite small pin through the skin, so as to hold them thus; then tie some of the tail hairs, wet in the blood, under the pin, drawing them tightly, and let the whole remain in this condition for twenty-four hours. The pin should then be removed, and the scar afterward wet with spittle occasionally.

The few remaining directions which may properly be laid down concerning bleeding, we give in the language of Youatt:

"When the bleeding is to be repeated, if more than three or four hours have elapsed, it will be better to make a fresh incision rather than to open the old wound. Few directions are necessary for the use of the lancet. They who are competent to operate with it will scarcely require any. If the point is sufficiently sharp, the lancet can scarcely be too broad-shouldered; and an abscess lancet will generally make a freer incision than that in common use. Whatever instrument is adopted, too much care can not be taken to have it perfectly clean, and very sharp. It should be carefully wiped and dried immediately after the operation, otherwise, in a very short time, the edges will begin to be corroded."

THE PULSE.



The cut admirably shows the muscles, nerves, and blood-vessels of the head and the upper part of the neck. We have reserved it to introduce here, in order to point out the location of the pulse so plainly that no one can be at a loss where to look for it. It will be easily found in the living subject, at the point here indicated by *w*. Down to *p*, inclusive, the lettering below relates to the muscles.

a The upper part of the ligament of the neck—the *whitleather.*

b The *levator humeri* (elevator of the shoulder), arising from the tubercle of the occiput, the mastoid (nipple-shaped) process of the temporal bone, and the transverse processes (cross projections) of the first four bones of the neck, and the ligament of the neck, and going to the muscles of the shoulders and the upper bone of the arm: to draw forward the shoulder and arm, or turn the head and neck; and, when the two levators act, to depress the head.

c The tendon common to the *complexus major* (larger complicated), and *splenius* (splint-like); to the mastoid process of the temporal bone, to hold up the head, or, the muscles on one side alone acting, to turn it.

d The *sterno-maxillaris* (belonging to the breast-bone) and upper jaw, from the cartilage in front of the chest to the angle of the lower jaw; to bend the head, or, if only one acts, to bend it on one side.

e The *stylo-maxillaris*, from the styloid (pencil-shaped) or coracoid (beak-shaped) process of the occiput, to the angles of the jaw: to pull the jaw backward and open it.

f The *subscapulo hyoideus*, from under the shoulder-blade, to the body of the *os hyoides* (the bone at the root of the tongue formed like a Greek *u*, *v*): to draw back that bone.

g The *masseter* (chewing); a most powerful muscle, constituting the cheek of the horse: from the upper jaw bone into the rough surface round the angle of the lower: in conjunction with the temporal muscle to close the mouth and chew the food.

h The *orbicularis* (circular) surrounding the eye and closing the lids.

i The *zygomaticus*, from the zygomatic arch and masseter to the corner of the mouth, to draw back the angle of the mouth.

k The *buccinator* (trumpeter), from the inside of the mouth and cheeks, to the angle of the mouth, to draw it back.

l The *vasalis labii superioris* (belonging to the nose and upper lip), from a depression at the junction of the superior maxillary and malar bones, to the angle of the nostril: to raise the lip and dilate the nostrils.

m *Dilator naris lateralis* (side dilator of the nostril), reversed to show the vessels and nerves which it covers, going from the covering of the nasal and frontal bones, to the angle of the mouth, and side of the nostril; to retract the upper lip and dilate the nostrils.

n *Dilator magnus* (great dilator), assisting in the same office.

o *Depressor labii inferioris* (puller down of the under lip), to the sides of the under lip; to pull it down.

p *Orbicularis oris* (circular muscle of the mouth), surrounding the mouth: to close the lips and dilate the nostrils.

q The upper portion of the parotid gland (gland near the ear) reversed, to show the blood vessels and nerves beneath it.

r The parotid duct piercing the cheek, to discharge the saliva into the mouth.

s The maxillary gland (gland of the lower jaw), with its duct.

t The jugular (neck) vein, after the two branches have united.

u At this letter, the submaxillary artery, a branch of the jugular, and the parotid duct, pass under and within the angle of the lower jaw; they come out again at *w*, and climb up the cheek to be distributed over the face.

v The vein and artery, passing under the zygomatic arch.

x A branch of the fifth pair, the sensitive nerve of the face, emerging from under the parotid gland.

y The main branch of the *portio dura* (hard portion) of the seventh pair, the *motor* (moving) nerve of the face coming out from beneath the parotid gland, to spread over the face.

z Branches of both nerves, with small blood-vessels.

The condition of the pulse is a consideration of the utmost importance to the veterinary practitioner. In most diseases he has no other means equally good of determining the actual state of his patient's system, and there is nothing which will guide him so well in forming his opinion in regard to the necessity for bleeding. As was remarked in the proper section

of Chapter II, the beats of the pulse simply indicate so many impulsions of the blood from the heart. Now, there can be no considerable excitement of the system, whether from exercise, intense emotion, or disease, without causing a correspondingly increased action of the heart. This is indexed by the pulse, and thus the presence of disease is readily detected, and its course traced throughout all its developments.

The pulse may be discovered and counted in several places on the horse's body, but nowhere else is it so easily found as upon the underside of the lower jaw-bone, at the point indicated in our description of the foregoing cut. Here the submaxillary artery passes over the edge of the bone, and feels like a small cord under the skin. By pressing the fingers upon it steadily, the pulsations may be felt pushing their way along at the rate of about thirty-five per minute in the farmer's horse, although some fine breeds average as much as forty, or even more, when in perfect health. This is what writers refer to when they speak of the *standard pulse.* The great advantage of resorting to the submaxillary artery to find the pulse is this: that here pressure upon the hard bone beneath enables one to determine, not merely the rapidity of the pulse, but also its strength and other characteristics.

Fifty beats to the minute, when the horse is not laboring under muscular or nervous agitation, constitutes a decidedly diseased pulse, and seventy or eighty betrays a most fearful state of excitement. Such is the case in blind staggers, for instance. As high a pulse as one hundred to the minute is recorded by English veterinarians; but the farm horse of this country rarely shows one above eighty, which is quite sufficient to soon wear out his vital energies. In inflammation of the lungs or bowels, seventy per minute is about the maximum attained in the great majority of cases.

In health the pulsations are slow and soft, making an impression, truly, that is readily recognized when the pressure of the finger is applied, but not hard and tense by any means. But as fever and inflammation come on, the vein becomes

more turgid; the blood is more heated; the action of the heart is heightened, and the pulse increases in proportion. It is sometimes the case that the blood is thick when there is but very little fever; but the amount of the latter is always indicated by the quickness of the pulse. The quick, throbbing pulse speaks of inflammation somewhere; the hard, corded pulse, of some chronic or long-standing disease. Sometimes we find the pulse to present both of these conditions simultaneously, and then the case is an alarming one, calling for prompt and vigorous measures, or death will probably forestall further efforts.

Besides the terms employed above, there are others in general use among horsemen, to distinguish the various kinds of pulsations recognizable under the influences of disease. The *hard* pulse is that in which the beats evidence powerful, perhaps even violent, over-action of the heart, but without much disturbance of the circulation otherwise. In the *wiry* pulse, they appear small as to volume, but hard and jerking, indicating great irritability in the region of the heart, so that the ventricles contract too soon, before they are properly filled. Danger does not lurk behind this, but advances with it boldly, defiantly, and with rapid strides indeed. It betokens acute inflammation, especially of the bowels, or sometimes of the urinary organs. The *oppressed* pulse exists when the arteries are too full, overloaded with blood thrown out from the heart, but returning to it with difficulty. There is obstruction somewhere, such that even the immensely powerful contractions of the muscular walls of the heart can hardly force the sluggish current through the blood-vessels. Inflammation of the lungs, a sudden and violent attack of pneumonia, is generally the cause of this phenomenon. In this case bleeding, if not carried to excess, will actually increase the strength of the pulsations instead of weakening them. It will be the proper recourse in all the conditions of the pulse thus far enumerated.

Not so, however, in the case of the *weak* pulse; for here there is debility and exhaustion, and the heart acts but feebly,

while the blood is poor and thin, as well as deficient in quantity. Such a pulse accompanies all diseases that tend to prostrate the system, and at other times may indicate the very near approach of death. Depletion means murder here. Stimulants, tonics, are what the patient needs, to arouse and assist the flagging life-energies to proper action.

Some persons bleed for every ailment, and others for none at all. There must be discrimination in this as in every thing else. When the horse is well, it is absolute folly and cruelty to bleed. Let well enough alone. But when the veins are turgid with blood, and the pulse, under the stimulus of fever and inflammation, is hard, wiry, or oppressed, the practioner who endeavors to cure the horse by means of medication only will generally find himself a fool for his pains.

For the more convenient reference of the reader, we will here recapitulate the various states of the pulse in disease, with the general indications of each concerning bleeding:

Quick throbbing pulse—inflammation: bleed freely.

Hard pulse—feverish excitement: bleed freely.

Full, corded pulse—chronic or long-standing disease: bleed moderately two or three times, ten days apart.

Small, wiry pulse—usually inflammation of the bowels: bleed copiously.

Oppressed pulse—usually inflammation of the lungs: bleed freely.

Weak pulse—debility: do not bleed at all.

Several things are to be taken into account in making up one's mind as to the frequency of the pulse, such as the horse's temperament, blood, customary employment, etc. Especially should the fact be inquired into whether the animal is overheated or much agitated by fear, as by these circumstances the pulse will be increased as much as from eight to twelve beats per minute. Fear, indeed, will occasion greater excitement, in this respect, than even exercise. In judging of the pulse, then, the horse should be as nearly tranquil as possible. It will be best to note its beats two or

three times, at least, before forming a final opinion concerning them.

THE MODES OF GIVING MEDICINE.

This will be the proper place for considering the different methods of administering medicine to the horse, which are four in number, as follows: Drenching, in the feed, the pill, and the clyster.

DRENCHING.

Drenching is the most common mode among the masses of horsemen, and generally the most successful; yet it is not without a share of danger to the patient. Many horses have been occasioned much suffering, some permanently injured, and a few even killed, by carelessness in administering drenches; especially in filling the mouth so rapidly that the liquid could not be swallowed fast enough, and portions of it being forced into the trachea, or windpipe. Strangulation and a severe coughing spell are the least serious consequences of this occurrence; or, perhaps, a cough may be induced that will prove obstinate and unyielding for a long time.

All this may be easily avoided. Enough of the drench should be turned into the mouth to nearly fill it, but no more until the horse has swallowed this, as he can readily do. He may sometimes refuse to swallow until he is compelled to do so, by lifting the nose up and down, so as to move the muscles of the throat; or, quite effectually, by pulling the mouth open with the hands. In extreme cases, where the horse proves utterly intractable, the drench may be turned into the nostril; but this, being still more dangerous than drenching in the mouth, should not be resorted to except in cases of entire failure by the other method, and where the disease is of such a character as to admit of no delay. If a small quantity, about half a gill, of the liquid be turned into the left nostril, it will run into the throat. Should the horse strangle, drop his head at once, and do not attempt to repeat the operation; for, while in most horses the drench will pass through the nostril into the throat without injury, there are others in

which this can not be done. If the first dose passes safely, the operation may be repeated at intervals of a minute or so, until the drench is all given. In all cases let the head drop after swallowing, before turning any thing more into the mouth or nostril, so that the animal may readjust the palate, which is apt to be cramped by raising the head too high. Upon the latter point care should always be exercised, the head being raised only just enough to allow the drench to run into the throat. Here is where much of the danger attendant upon drenching arises. When the head is too much elevated, the glottis may be forced open, permitting the liquid to run into the trachea, or windpipe.

Giving the drench is a simple operation, with most horses, at least. The best method is by using a long-necked bottle, holding about a quart. Fill the bottle with the drench, always warm if it can be made so, and insert the neck of the bottle into the mouth, upon the right side of it, and just in front of the jaw teeth, or grinders. Stand in an elevated position; for instance, upon a bench or box. Lift the head carefully with the left hand, and, with the bottle in the right, turn out a gill into the horse's mouth and throat. If he swallows it, as he will be likely to do, drop his head, and let him work his jaws and the muscles of his throat for a minute or so. In this manner continue until the whole drench is disposed of.

A few simple directions in regard to preparing the drench may be of value to some. The liquid must contain no powders, lump, or sediment of any kind; for these may cause strangulation, and do serious injury. When any medicine is to be administered that is in powder or lumps, give it in some other way, and not in a drench. The great advantage of drenching consists in the greater rapidity with which remedies act than when given in any other way. The pill is a much easier method of medication, but the drench will usually have done its work before the pill is dissolved.

THE PILL.

This constitutes a more safe and expeditious method of giving medicine than drenching, and in cases of chronic diseases, and all others that can wait upon slow action, it is to be given the decided preference. The medicine may be mixed with some flour and water, and the whole rolled into a pill about an inch in thickness and an inch and a half in length. Put this on the end of a stick, pull out the horse's tongue carefully, place the pill on the roots of that organ, if necessary pushing it back gently with the stick. Now let the tongue fly back suddenly, and the horse will be compelled to swallow the dose. Care must be taken not to injure the throat with the stick. A person with a small hand may introduce the pill with the ends of the fingers better than with the stick.

IN THE FEED.

This is the style of medicating which horsemen prefer, as it is attended with no danger and but little trouble. But there are a great many medicines which can not be given in this way; and, at any rate, it is only applicable to those cases where speedy action is no especial object. Another difficulty arises from the fact that many horses refuse to take medicine thus. Hunger, however, will generally bring the animal to it; but if he manifests an unusual aversion to the food, it will be better to give the remedy in the form of a pill rather than starve him long. In fact some medicines are so exceedingly distasteful, that with them it will be of no use to try any thing but the pill.

Some skill is desirable in disguising the medicine in the feed. It may be put at the bottom of some meal, or only a little given at first, until the horse has learned to eat it with less disrelish. Whatever is given in this way should be reduced to a fine powder, and mixed with such feed as bran or meal mashes, cut feed, or oats.

THE CLYSTER.

The clyster is a liquid medicine, injected into the rectum of the horse by the aid of a syringe, or some other means. It is not designed to supersede any of the other methods of giving medicine, but to act in conjunction with them, especially in cases of extreme costiveness or stricture. In colic, inflammation of the bowels, lock-jaw, or any other disease in which the bowels are obstinately closed, it is a valuable assistant in hastening evacuations. In all cases where an active purge is needed, and at once, the aperient medicine given into the stomach can be much expedited in its action by a simultaneous use of the clyster. It is also of great service in checking diarrhea, or "scours." Finally, in several diseases—lock-jaw, for example—nutrition may be introduced into the system in the same way, in sufficient quantities to prolong life for a considerable period.

The best and easiest means of administering a clyster is with a regular syringe, with the appendix of a gum-elastic tube. If this be not procurable, the operator may substitute a cow's horn, open at both ends, or a gourd with a long handle, of which the small end had been cut off. When the latter is used, the clyster medicine may be turned into the bowl of the gourd, the small end having first been inserted within the rectum; and, on elevating the bowl, the contents will pass out at the other end. This is a very convenient mode. A tube made of leather, and covered with old muslin, or some similar fabric, will answer the same purpose. Whatever is employed should have a smooth surface, and be well greased, so as not to injure or irritate the rectum.

An aperient ball may be made by mixing the clyster medicine in some flour and water, and then pushing this into the rectum with the hand, as far as the arm can reach. Being placed between the ends of the fingers, and the hand and arm well greased, it can be thrust forward eighteen or twenty inches. Food-balls may be given to the horse in the same way in cases of stricture, inflammation of the bowels, lock-

jaw, and the like, in which either nutrition can not be introduced into the stomach at all, or it is hazardous to do so.

We subjoin a list of some of the clysters that may be given the horse in different cases, with the ingredients of each. In all cases, we prefer the clyster in solution to the ball, with the exception of the food-ball, which is undoubtedly a better means of giving food to the horse than the solution:

Aperient Clysters.—Solution of Aloes..... 4 dr.
Solution of Epsom salts.... 8 oz.
Solution of assafetida..... ½ oz.
Lard..... 1 pint.
Turpentine (in a pint of warm water)..... 1 table-spoonful.

Cooling Clysters.—Solution of Epsom salts..... 4 oz.
Salt and water..... 1 pint.
Slippery elm mucilage..... ½ pint.

Astringent Clysters.—Laudanum (in a pint of warm water). 1 oz.
Blackberry root tea (in a pint of warm water)..... 1 gill.

Nutrition Clysters.—Meal gruel (warm)..... 1 quart.
Slippery-elm mucilage (thickened with meal)..... 1 pint.
Arrowroot (thickened with meal)... 1 pint.
Sweet milk (thickened with flour).. 1 pint.

Each of the above is to be used separately as a clyster. The practitioner must exercise his own judgment in selecting from each class that which will probably be most successful in the particular case he has in hand.

The aperient and food balls may be composed of the materials indicated in their respective classes, with the addition of flour. The ball should be about three inches in thickness.

CHAPTER XVI.

POISONS, POISONOUS SNAKES AND INSECTS, ETC.

The action of poisonous substances is not uniformly the same upon the horse as upon the human subject, for, although some of these are nearly equally destructive to both, many that are deadly in their effects upon the biped are quite innocent when given the horse; and still others are in the highest degree injurious to the latter, but not at all harmful to man.

In this chapter the design will be to describe, not the action of those poisons which are known to be universally destructive to animal life, for of these there is no need to warn the reader against using, but to call the attention of all classes to the dangers attending the employment of various drugs which many people are ignorantly accustomed to give their horses to purify the blood, and for the improvement of condition generally, and to point out the best antidotes that are known for the counteraction of their effects when they have been given either by accident or design. We shall also have occasion to treat of the various animal poisons to whose operation the horse is sometimes exposed—the bite of serpents, the sting of poisonous insects, and the like.

Often nothing will avail in a case of poisoning. Poisons usually act very quickly, disorganizing the blood and the tissues of the body so rapidly that only the promptest possible measures will save the victim's life. Others, however, do not kill at once, but the horse lingers along in misery, and finally dies—it may be even months afterward. Many cases of chronic disease and permanently-impaired health has the writer known among horses that were traceable to nothing else in the world than the use of poisonous medicines. Such remedies, every intelligent farmer and horse-

owner will entirely ignore in his veterinary practice, and upon no consideration whatever will he be induced to have any thing to do with them. There is no need to resort to the use of such poisons in any case, for there is an abundance of other medicines to select from which are equally or nearly efficient, and attended with no dangerous consequences.

It is not often that the horse is poisoned internally, except as before adverted to—by the careless or ignorant use of certain articles administered as medicines. Natural instinct teaches him to avoid most of the poisonous herbs that commonly grow in the pasture-fields, where he seldom receives any injury of this kind, unless it be occasionally from the poisonous weeds and vines with which his nose may come in contact during grazing. Perhaps the chief danger of internal poisoning to which the horse is exposed proceeds from the mean, dastardly mode which some cowards adopt to take revenge upon an enemy—that of destroying or ruining his horse.

In 1866, we treated an aggravated case of this kind in Petersburg, Boone County, Kentucky. A young horse, from motives of revenge which some miscreant entertained toward his owner, was poisoned by applying some villainous compound to the animal's nose, causing it to swell to three times its natural size, while great blisters came out all over the surface. The treatment was alternate washings with hot salt and water, and a strong decoction of golden seal, every four hours. This gave relief in a short time, and in a few days the horse was quite well.

In many districts of the South and South-west, however, the stock-raiser has much more reason to dread the bites of venomous serpents, insects, etc., than any of the other sources of poisoning.

The subjects of which we propose to treat in this chapter may be grouped under three different heads; namely, internal poisons, poisons of the skin, and animal poisons. The latter includes the bite of venomous snakes, and the sting of scorpions, poisonous insects, hornets, wasps, etc.

INTERNAL POISONS.

This, of course, is the class of poisons which communicate their hurtful influences through the medium of the stomach and the lacteal absorbents of the intestines. Many of them prove deadly at once; but these are all too well known to need any enlarging upon here. Our object is to warn against the employment of such as are slower in their action, and whose ill effects, in consequence, are more apt to be overlooked.

Nux Vomica.—This is used extensively in many parts of the country as a purifier of the blood and a promoter of condition, but never without decided injury to the horse. It is a powerful poison, injuring the teeth, destroying the healthy tone of the stomach, impairing digestion, and producing general derangement of the bowels. For a time it may possibly appear to benefit the horse, and to abate disease, yet its results are so uniformly disastrous in the end that it should never be given the animal as medicine. Besides being an unsafe remedy at all times, it is wholly unnecessary, since the prescriptions laid down in this work will accomplish the desired ends more perfectly and without hazard.

Among the symptoms of poisoning from this source are the following: The pulse is irregular; the mouth and tongue, white; the saliva, stringy; the membrane of the nose, a dull purple; the eyes, a whitish yellow; the breath, hot and feverish; the skin likewise hot and dry, and the hair rough and standing. Not all of these are necessarily present in every case, but some of them always are; and occasionally others, of a more alarming character, supervene, such as colic pains, retching of the stomach, excessive flow of highly-colored urine, etc. Spasms and convulsions may next ensue, and then death is not far off.

The antidote, in this case, is grease. Give the horse a pint of sweet oil or lard, with six eggs broken into it, to hold the

poison in solution; then set to work to bring about an evacuation of the bowels as soon as possible. Use the clyster freely—a quart of warm, strong soap-suds—and this repeated every half hour until a discharge is secured. Follow the original dose of oil, in two hours, by a drench of strong salt and water, as hot as the horse can bear it. In this way the horse may usually be saved, even when the symptoms of poisioning were decided; but the owner will be exceedingly fortunate if he does not afterward find the animal's vigor noticeably impaired, or his future history show a strong tendency to colic.

In 1851 we had under treatment a very bad case of fistula—that of a horse belonging to a gentleman named Fowler, living in Gibson County, Tennessee. The condition of the animal was low, and the blood in a very impure state. During our absence, and, of course, without our knowledge, the owner was prevailed upon to administer nux vomica for the purpose of cleansing the blood. Half a button per day was the dose, and of these nine had been given, when, upon the tenth day, the poor creature died—poisoned to death.

Cantharides, or Spanish Flies.—This is a dreadful poison, of the strongest diuretic properties. It is unsafe given in how small quantities soever; and for this reason, notwithstanding that nearly all veterinary writers prescribe it, with more or less strenuous cautions, we must condemn it altogether. Given internally, it very often produces strangury and death; and if these sad results do not follow, there will generally be found a permanently-diseased condition of the urinary organs, extending not unfrequently to the stomach and bowels also. Whether administered in large or small doses, it is hurtful in the extreme. Perhaps the large dose is really least objectionable, as it soon puts the victim out of his misery, while the small dose operates in the way of a slow and lingering torture. One drachm given the horse will kill him in a very short time.

"In the breeding season," says Youatt, "it is shamefully

given as an excitement to the horse and mare, and many a valuable life is lost by the abominable practice." This we indorse, and will go so much further as to say that the scamp who would be guilty of such a procedure ought to be sent to the penitentiary. Strangely enough, this usually excellent and judicious veterinarian sitll prescribes the use of cantharides in small doses. We must express our astonishment that any respectable authority should recommend it in any case; and our advice to the farmer is, have nothing to do with it, nor with the ignorant fellow who would bid you give it so much as a trial. As a blister, the corrosive liniment will accomplish all that cantharides can, and is preferable in every way.

The symptoms of poison from this source are a hot breath, a rapid and irregular pulse, and colicky pains. Crampings, convulsions, and death complete the series.

In regard to an antidote, it is difficult to prescribe. If your folly has been so great as to lead you to give your horse such abominable poison, you will probably have the poor satisfaction of seeing him die from its effects, and the consolation of knowing that this is work of your own doing. A pint of castor oil, to act upon the bowels as soon as possible; six fresh eggs, at the same time, to hold the poison in check; and then a vigorous use of the warm soap-suds clyster, comprise all that can be done, except to make up the mind never to be caught in the like folly again.

Copperas, or Sulphate of Iron.—This is another substance sometimes given the horse as a promoter of condition that is really very detrimental. It is highly injurious to both the stomach and the teeth, and should be thrown aside entirely in treating the diseases of the horse.

In general terms, the sulphates, acetates, and nitrates of copper, lead, silver, and zinc are poisonous to the horse—sufficiently so, at least, to condemn their administration as internal remedies, although many of them may be used with decided benefit in the forms of liniments and washes. There

are three minerals of great service in medication, whose judicious employment may be especially recommended. These are oxide of iron, calomel, and nitrate of potassium.

Corrosive Sublimate.—This is a direful poison, of fearfully destructive effects when introduced into the stomach; but though so deadly a potion, it forms, with other ingredients, one of the most valuable liniments in the world. It is the most powerful principle of the corrosive liniment, so often recommended in the previous chapters of this work.

Acids.—None of these constitute a suitable medicine for the horse. They are the acetic, citric, muriatic, sulphuric, nitric, tartaric, oxalic, and prussic—all of which are to be rejected as injurious, and some of them as most swift and deadly poisons.

Alkalies.—Alkalies and their salts may all be used at times with decided advantage as correctors of an acid condition of the stomach, or as mild and safe diuretics. In this list of remedies, the nitrate of potassa (the niter, or saltpeter, of every-day life) stands high as a mild diuretic. It should be given only in small doses, and never except in clear cases of urinary disease. Common wood ashes is of exceeding value to the horse, and, when he is in the stable, they should be given him as regularly as his salt, but in moderate quantities, of course. The tendency in the stomach of the horse is toward acidity and fermentation. Acids aggravate this condition, and ruin the horse; alkalies correct the former, and relieve the animal.

Creosote.—Given in large quantities, this is poisonous to the horse; but in doses of ten drops, in some warm water, it is very serviceable in both cramp and flatulent colic.

Tobacco.—"The weed" is a poison, although many men seem never to suspect the fact. It is not to be used in-

ternally in veterinary practice, except in cases of farcy, distemper, and glanders, where we prescribe it on the principle of employing one poison to neutralize and destroy another lurking in the blood.

Tar.—This substance is not a poison; but it is not best to give it to the horse unless well mixed with grease, as, in its fresh state, it is apt to choke the animal, and has been known to form balls in the stomach that killed him. It has some valuable pectoral properties, when mixed with other ingredients. The oil of tar should not be used.

Turpentine.—Turpentine is an excellent constituent of external applications, such as liniments, the best of which can hardly be made without using it to some extent. It is a rubefacient, (as those substances are called which produce redness of the skin,) and, opening the pores, it prepares the way for the other ingredients of the liniment to act; but, given internally to the horse, it is poisonous to both the digestive and urinary organs. The oil of turpentine should not be used at all. The turpentine from the tree is better than either.

Tartar Emetic.—This may be used advantageously, in small doses, to abate fevers, and is particularly valuable in inflammation of the lungs and all catarrhal affections. It is a powerful nauseant, and, in large quantities, has the effect of an active poison. In doses of from a drachm to a drachm and a half, when given in connection with niter and digitalis, it excites the secretions of the skin, acting as a powerful diaphoretic as well as diuretic. In overdoses it is apt to do injury. As the horse can not vomit, it is safest to accompany tartar emetic with a small dose of salts.

Croton Oil.—Great danger attends the use of croton oil in veterinary practice. It is admissable only in very extreme cases of costiveness and stricture. Such is the rapidity and

violence of its action, that it often does material injury before the bowels relax, having a strong tendency to produce rupture and death. The dose is from eight to ten drops, in some warm water; but the instances are rare in which milder remedies will not serve a better purpose.

As an external application, however, in all cases where an active liniment is needed, croton oil is quite valuable. It should be mixed with sweet oil, in the proportion of ten drops of croton oil to forty drops of the latter. Applied with a cloth or brush, and well rubbed in, this is a very efficient adjunct in the treatment of colic, inflammation of the lungs or bowels, sprains, cramps, nervous affections, etc.

The antidote for an excessive dose of croton oil consists of a full dose—from one to two ounces—of laudanum, followed, in four hours, by half a pound of Epsom salts.

Of the large number of vegetable poisons, there are very few which appear to be very injurious to the horse. It is a matter of extreme doubt, in fact, whether any vegetation grows in our country from which there can arise any danger of his being poisoned to death. We have often known him eat with impunity the leaves and buds of the "jimson" weed, and the ground and fence ivy of the meadows. Externally, these are poisons; but taken into the stomach they do not harm the horse. We know of but two plants growing in America that he will ever eat which act as a poison to him. These are the poison-oak that grows upon dead trees and stumps, and the laurel growing upon the bluffs of creeks and rocky chasms.

For these the following is the antidote: A pint of lard and half a pound of salts, to evacuate the bowels as soon as possible, followed, in two hours, by some lime or chalk water.

Belladonna, or Deadly Nightshade.—This is a deadly poison in its prepared form; but the horse will not eat it when growing wild, as it does in the United States only in certain sections. It is a powerful narcotic and sedative, and, in

small doses, is a valuable auxiliary in all cases of undue action of the nervous and vascular systems, especially in affections of the heart and lungs. The proper dose is five or six grains of the powdered leaves. Given in overdoses, it has sometimes been the cause of death.

White Hellebore.—This is a virulent poison, very dangerous in the hands of those who are ignorant of its properties. In small doses, it may occasionally be used to advantage, but it is always to be administered with great caution. It is a powerful cathartic, and very drastic. In diseases of the lungs, especially in inflammation, it acts with great force upon the pulse, lowering it very rapidly. This proceeds from its powerful restraining influences upon the heart, whose throbbing will be stilled forever by a drachm or a drachm and a half of white hellebore. A half-drachm is a large dose, and one-fourth of a drachm is as much as can be given without some hazard. The practitioner should have recourse to this drug only in very extreme cases.

The prominent symptoms of poisoning from this cause are three: a rapid sinking of the pulse, hanging of the head, and frothing at the mouth.

The antidote is half a pint of Cayenne pepper tea, with half an ounce of laudanum, or a drachm and a half of opium, in it.

Black Hellebore.—Like the white hellebore, this seldom grows in our meadows and pastures, and, both being very offensive to the horse, he is in little danger from either; nor are they often used by our farmers. The black hellebore is not as poisonous as the white, but possesses no properties which can justify its use internally. As an external application, it has some valuable medicinal qualities, especially as a liniment for old sores, or certain fistular ulcers. For this purpose the thick syrup or extract should be taken and mixed with grease, by which means a very active ointment will be formed, of which but a small quantity need be used at once.

POISONS OF THE SKIN.

Corrosive Sublimate.—This is a very active, irritant poison, and is not to be tampered with, except as its use is indicated in this work. With certain other ingredients, enumerated in the proper section of Chapter XXIV, it forms the invaluable corrosive liniment.

May-apple Root.—This is a poison to the horse, and when given internally is one of the most drastic of medicines, after occasioning severe and almost uncontrollable purging. In this manner it should not be employed at all. As a liniment, however, prepared by combining lard with it, it possesses properties for curing fistula and poll-evil superior to any other known remedy. The uncombined extract is a very active poison to the flesh of the horse, and must never be used.

Poison Oak, or Running Sumach.—The creeping plant known by this name is most frequently found climbing old stumps of trees, piles of stones, and the like. Although the horse will eat this only occasionally, it often poisons his nose and ears, and sometimes his feet, when they happen to come into contact with it in grazing. It causes dreadful blisters and scabby eruptions.

The treatment is as follows: Wash with the tea of golden seal three or four times during the day, and at night rub in some old grease over the poisonous surface. In the morning wash off the grease with warm soap-suds, and apply the decoction of golden seal again. Continue this course as long as may be necessary to heal.

There are several other poisonous plants and vines common in various parts of the country, such as the meadow ivy, the poison vine, the hemlock, the "sneeze-weed" of the South, and some others. The weed last named is a great pest of the pastures and woods of many portions of Middle Tennes-

see, where many colts and horses are almost ruined by it during the months of August and September.

The treatment for all external poisons of this class is that just prescribed for the poison oak—frequent washing with the decoction of yellow-root, or golden seal, with nightly anointments with grease. If, as sometimes happens in cases of severe poisoning, the legs swell and the joints become stiff, wash them repeatedly with hot salt and water, and rub them well with the hand or a brush.

ANIMAL POISONS.

Snake Bites.—Nature has populated the Western Continent with many varieties of serpents and poisonous insects. Some of the Western and South-western States, especially those bordering upon the Mississippi River, are greatly infested with them. In West Tennessee, where we formerly resided—a land of thickets and underbrush—the rattlesnake abounds, and is often found in the yard, sometimes under the very door-step, and has been killed in the log out-houses and stables. Besides this venomous creature, there are others on all the tributaries of the great river; and the whole country on the lower portion of the latter's course are tenanted not only with the rattlesnake, but also the spreading adder, the moccasin, the cotton-mouth, and the black and water vipers.

It is not often that the horse is bitten by a snake, yet it sometimes occurs. Four or five cases are all that we ever met in a practice at the South of nearly twenty years Nearly all serpents give warning to any animal approaching them; and the horse, unless his hearing is impaired, never fails to take the alarm and flee from danger. Of those that are unquestionably poisonous, not all are equally so, the venom of some being much more active than that of others. Otherwise, the quality of the virus seems essentially the same in each, and hence a uniform course of treatment is to be practiced for counteracting their effects.

The common and most effectual antidote is large potations of proof whiskey—half a pint, every hour, in warm water,

with a little hartshorn—and continued washing of the wound with hot salt and water. Half a pound of salt should be given the patient at the outset. This method will cure when the horse is first bitten; but after great swellings have taken place, no remedy can be depended on. Extensive suppuration and gangrene will probably supervene, followed by derangement, blindness, convulsions, and death.

If the bite is discovered immediately, the better plan would be to cut out the entire wound with a sharp knife, and apply some of the corrosive liniment; or, in the absence of this, a very small quantity of pulverized sublimate; yet the internal treatment, as above prescribed, should not be neglected. By this means the virus will be effectually counteracted. A thimble pressed forcibly upon the wound, and bound fast, will often extract the poison and prevent swelling.

Venomous Spiders.—Spiders abound in every part of the country, but only a very few are poisonous, or ever bite. There is a species of black spider, with a small white spot upon the back, whose bite is nearly as deadly as that of the rattlesnake. All of the large black spiders are more or less poisonous, and will sometimes resent pressure by biting; but none show such a viciousness as the one just referred to, except the terrible tarantula of the plains of Texas. This latter monster, whose body sometimes attains to a length of two inches, while his legs are twice that in length, will attack both man and beast, and only the most prompt and energetic treatment can save the victim's life.

Horses are sufferers from these insects more frequently than is generally supposed. There is a swelling and soreness of the nose or legs, for instance, and the owner is apt to attribute it uniformly to some contusion or strain, when, in many cases, it is really caused by the sting of these detestable creatures. The proper course is to examine all such swellings, and see whether there is any appearance of a wound, or of a nucleus that is fuller and harder than the surrounding skin. If so, the case should be promptly treated as for poison.

The treatment is as follows: Give half a pint of proof whisky in some warm water, with a tea-spoonful of hartshorn in it. Wash the swelling with hot salt and water. If the horse has been bitten by one of these spiders, a running sore may be the result, in which case the corrosive liniment should be applied every day for two or three days, and will heal without fail.

The Centipede.—This is a poisonous worm found in Texas, where the people have corrupted the name to "Santa Fe." It principally infests old, rotten logs and dark, hidden places. Instead of possessing one hundred legs, as its name implies, it has twenty-four, each of them pointed with a hollow thorn, out of which exudes the poison from a little bag at its root. The construction of these legs, in fact, is very much the same as that of the fangs in the serpent. These venomous creatures are not common, but very deadly. It is generally believed that their sting is necessarily fatal, death ensuing in a few minutes. Horses and cattle are often killed by them.

We are of opinion, however, that life might probably be saved by the immediate use of proof spirits, both very freely as a drench and externally as a wash, mixed with equal parts of hartshorn.

Stinging Scorpions.—These are strange creatures, inhabiting the same regions as the centipede. They are every-where, and infest every place—houses, stables, piles of plank and of wood, and almost every hole and crevice. They dart from their retreat with almost the swiftness of lightning, and, dropping upon some person or animal, seek to hide under the clothing or the thickest hair, and, if molested in any manner, are sure to sting whatever they may be upon. Their sting is not often fatal; it is somewhat more severe than that of a wasp or hornet, and, although hurting but little at first, the pain becomes very acute in about half an hour afterward.

The symptoms are very peculiar. The first sensation of pain is felt under the tongue, which organ remains nearly

paralyzed for a considerable time. Swelling and heat proceed from the region of the wound, with the accompaniments of nausea and giddiness. In the human being, these symptoms sometimes terminate fatally, but to what precise degree the sting affects the horse is not so well known. That it is poisonous and exceedingly painful to horses and cattle is undoubted; but as stock runs at large in that country of universal grass, opportunities to trace the effects of the sting in their cases have not been very favorable.

In Texas, whisky is the antidote for all ills. When stung by the scorpion, the people have recourse to the beverage at once, using it bountifully both internally and externally, and thus obtain relief in a short time. The treatment in the case of the horse will be of the same character.

Hornets, Wasps, etc.—These do not often sting the horse, and are never very hurtful, so that a simple prescription to relieve the pain will be all that is necessary. The first thing to be done is to press the large end of a thimble around the sting, so as to make a deep indentation in the skin, and then to wash the place with onion-juice, or with hartshorn and oil, mixed in the proportions of three parts of hartshorn to one of oil. Hot salt and water is equal to any thing ever used as a wash after the sting of bees or wasps.

In a few instances, the potato-fly or bug has poisoned the horse. For this, grease the surface affected, and in two hours wash off with soap-suds, and when dry apply the decoction of yellow-root or golden seal. Continue alternating with these applications until the horse is quite well.

Gadflies, Gnats, etc.—This will be the proper connection in which to consider the ravages of certain insects not really poisonous, but more dreaded by the stock-raisers of the South-west than the reptiles, etc., that are.

Tobacco-smoke will keep away gnats, gadflies, and mosquitoes. Green pennyroyal placed on the head, under the top of the bridle, will also drive them away; or they may

be kept at bay by rubbing the body and legs with a handful of the green herb. Any of the essential oils rubbed on the parts which they especially infest will keep them away.

There is a species of large gnat, known as the "buffalo-gnat," about one-third as large as the common house-fly, that is a terror to the horse, mule, and deer of the regions in the vicinity of the large river swamps of the lower Mississippi, but which does not often trouble other animals. It makes its appearance on the first warm days of spring, and comes in swarms of millions, which attack their victim with a murderous ferocity. They cover his side, flanks, belly, breast, head, and neck; the nostrils and ears are literally filled with them; and, unless prevented, they will even crawl up into the nasal cavities, so as to fairly strangle the horse to death. It is not at all uncommon for them to kill both horses and mules.

Perhaps fifty times, while riding through the regions named, have we been compelled to get a bush and brush away at the gnats, while the horse went at the top of his speed to the nearest house, there to receive a smearing of lard and tar, the only thing that would keep his insatiate tormentors at bay.

In 1862, a regiment of Confederate cavalry encamped in Holmes County, Mississippi, near where the author was then residing. Thirty-five mules, belonging to the wagon-train, were destroyed by buffalo-gnats in one night—a fact of which we had personal knowledge.

Hunters often build large fires, and set old trees and stumps on fire, and the deer coming and standing in the smoke to get rid of the gnats are often shot down by the hunter from his ambush. In this way, numbers of unsuspecting animals are sometimes killed. The deer all leave the swamps for the interior when the gnats are unusually tormenting. The buffalo-gnat never attacks the human being. The swarms in which it always moves come all at once, and go the same way. They remain usually about six weeks, and in one day's time will all be gone, so quick is their disappearance.

Every negro on the cotton plantations of the infested districts knows what to do when the gnats come, and there is not one of those plantations on which a bucket of tar and lard is not carried to the field, each morning, in the season for gnats, nor a horse or mule but is thoroughly smeared with them. The mixture is composed of one part of tar to two parts of lard, and of this a very thin coat is spread upon those parts of the animal where the gnats light to suck his blood. Coal oil is very efficient in keeping the gnats at bay, but its effects do not last like those of the tar mixture.

The Borer-worm.—This is the larva, or maggot, of a hairy or wooly fly that infests the plains of Texas, and is the terror of the cattle and horses of the prairies, large numbers of whom the borer-worm destroys annually. Woe be to the unlucky cow or pony that has the misfortune to receive a cut or puncture, or a wound of any kind, sufficient to draw blood; for this fly is sure to be there, and to deposit its eggs within the wound. From that moment the animal is doomed. The worm is furnished with an augur-like fang, with which he penetrates into the flesh; and this is the beginning of the borer-worm's *bunch.*

The animals of the prairie all manifest an instinctive dread of these flies, and when the skin is cut or torn in any manner, so that blood flows from it, they appear to be aware of their danger. As the fly comes about, the alarmed creature starts to run away. This is the sure means of collecting hundreds of these flies, which dart with lightning-like velocity upon the warm and oozing blood and deposit their eggs, and the work of destruction at once begins. The victim stops when completely tired out, and begins to exert himself to drive these terrible enemies away. Had he done so at first, perhaps his chances would have been better. But now the fearful work once commenced, the poor creature yields to his dreadful fate, and thousands upon thousands of maggots are soon busy within the wound. As the part inflames it swells to an enormous size, the worms, meanwhile, contin-

uing to bore deeper and deeper, and to imbed themselves lower down in the flesh. While the first army of maggots is thus ravenously seeking for new flesh and fresh blood, the fly deposits new recruits, that soon follow the others in search of untasted tissues, on which to feast themselves. The skin forms a sack or bag to hold the perforated parts and keep them from sloughing off, and these parts become a fungous, spongy mass of inflamed and rotten flesh, whence constantly exudes a purulent, offensive matter, which constitutes the food of the fly and the home of the maggot, or borer-worm.

The head and shoulders are the parts most frequently attacked, but no wounded member or surface escapes. The magnitude of the borer-worm bunch, and the quantities of these vampires that they often contain, are perfectly incredible. The bunch has been seen upon the horses, cattle, buffalo, and deer, of all dimensions, from the size of a man's hand up to that of a bushel-basket, and has been found to contain not merely quarts, but absolutely bushels of the maggot-worm Of course, death soon comes to the relief of the wretched animal, and mercifully puts an end to tortures inconceivable.

On the great plains of the West, the buffaloes, wild horses, and deer often fall a prey to the fearful rapacity of the borer-worm, bunches of which they have been seen carrying upon their bodies of such enormous bulk that no one could believe the accounts given of them, unless his own eyes had seen them. Droves of wolves follow these poor animals night and day, hanging around them until they become so weak as to be unable longer to defend themselves, when they are devoured by the hungry pack.

A writer in the "Waverly Magazine," a few years since, gave a most graphic, yet sickening, description of the ravages of the borer-worm, under the caption of the "Maggoty Buffalo." The author of this work, when in Texas in 1851, saw cases of the kind above described, although none in their most advanced stages, and often heard the people of that region recount the horrible operations of this terrible scourge.

It was considered a certain death for the borer-fly to begin depositing its eggs within any sore, unless the cattle were herded in pens, and the worms destroyed by the free use of turpentine; and even this was not always effective. When in the stable, the horse was not disturbed, and if he happened to be wounded in any manner, could be more easily caught and handled, and the injured surface readily protected from the fly until it healed.

It was there conceded that turpentine was not a certain means of destroying the worm in all cases, and, to be successful, must be constantly and vigorously applied, the animal being kept in a lot or pen for this purpose until entirely well. We believe that we have a remedy exactly adapted to meet the requirements of this case—one of which it needs but one or two free applications to reach the bottom of the deepest abscess, and one that is certain death to vermin of all kinds. This is the corrosive liniment. Cut open the bunch and expose the worms; then pour into it a not stinted quantity of the liniment, which will surely kill the worm as soon as it touches him.

The corrosive liniment possesses the peculiarity of great penetrating powers beyond all others we ever tried. Used in the manner here laid down, it will be quickly carried to every part of the abscess, and prove the swift destruction of the horse's formidable enemy. Aside from its many other highly important applications in veterinary practice, it will be, in this respect alone, a boon of incalculable value to the stock-raisers of Texas and the great prairies of the Southwest generally.

CHAPTER XVII.

FOOD AND GENERAL TREATMENT.

With this chapter we enter upon another division of our work—the consideration of the horse's food, treatment, and management generally. Here an interesting field of investigation opens before us, and one of primary importance to every owner of the horse. Possibly this department of our subject should have had the precedence of all others, since, upon a proper attention to and observance of the laws which we here find in uniform operation, depends entirely the animal's health, and hardly less his good qualities. We are of the opinion that the matter of diet—its adaptation, especially, to the varying ages and conditions of the horse and to the changing seasons of the year—has more to do with the improvement of blood and the development of fine qualities than any other consideration whatever.

Many farmers say that they "have an unvarying rule in the treatment of their horses." Now, this is simply an avowal that they have adopted a course of most inconsistent and ruinous management—a course that at one season of the year will overfeed the horse and engorge his whole system, and at another will starve and impoverish him; a course that may be advantageous so long as he remains in health, but detrimental in the extreme when disease begins its insidious approaches.

The system of the horse varies in its capabilities, its conditions, and its needs as much as that of the human being. Some horses can live and thrive upon certain kinds of food that others can not eat without being greatly injured, and the condition of the same horse may vary so much that what is proper and healthful at one time ought to be absolutely

prohibited at another; or it may be that the horse, from the effects of disease, can hardly be induced to eat any thing at all. There is a similar difference in regard to the changing seasons of the year. The farmer who pursues exactly the same system of feeding and treatment in the summer that he did in the winter, will find his team becoming fat at one time and thin at another—lively at one time and stupid at another; now in fine condition, and then in bad plight and poor health.

A difference likewise exists between spring and fall, especially the close of the latter, toward winter—between the shedding of the hair, which takes place in the former, and its increased warmth and thickness in the latter. The case is the same when we contrast the circumstances of work and rest, or of hard labor and mild exercise. A horse regularly and severely tasked needs more and stronger food than one which stands most of the time in the stable, being exercised but seldom, and then quite moderately. The food needful for the one will kill the other, or, at least, occasion serious disease. Many of the serious ailments of the horse arise from an unreasonable adherence to one certain system of keeping. Upon the farm, the animal works hard through the spring season, and until after harvest; then a time of rest comes on, when he has but little or nothing to do; and still the ignorant owner gives the same full, strong diet as ever. If such a horse does not fall off in flesh, his appearrance of fattening is pretty sure to be attended by the influence of some dire disease that is being generated in his system.

Then the horse in low condition requires a different keeping from the one in fine plight and spirits; and so does the colt from the old or mature horse. Seasons vary; age, condition, health, and labor vary; and a rational and generous management must vary its details, also, in a corresponding degree. The rudiments of a proper, systematic knowledge of the business of the farmer and breeder consist in a thorough acquaintance with the varying wants of the horse under

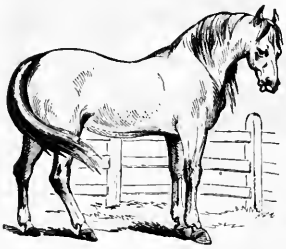
all the modifications of his circumstances and surroundings; and to learn the laws bearing upon this subject should be the study, as it certainly is the interest, of all owners of the horse every-where. It will be our object, in this chapter, to throw what light we can upon these important matters, and to present a few plain and practical directions in regard to the best methods to be pursued.

There are two conditions, already adverted to, in which the horse demands stronger feed, and more of it, than any others—hard service and cold weather. In the spring season, Nature, that has wrapped herself for months in a covering of snow to resist the severities of winter, now throws off her mantle, and undergoes a change throughout her entire material organism. Her law, in this regard, is universal, and nothing is more plainly subject to and affected by it than the horse. His coat is shed, his skin changed, his blood thinned, and his digestion altered to some extent. His stomach will not digest, neither does his body require, the food that was needed during the cold of winter. That season, with its pressing demands upon the vital energies, has gone; the frame has now relaxed, and less food, and milder, will meet all the animal's wants, under the gentle influence of spring. All Nature has been dead and dry for nearly half a year; and the body that has been fortifying itself with stimulating food and warm clothing, with thickened skin and a denser coat of hair, to meet the rigors and exactions of winter, now needs no longer the concentrated substances of the dry food and strong diet.

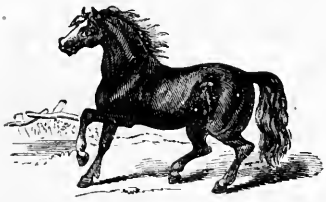
But while the body has thus been changing, in harmony with Nature, so that it now requires other food, Nature has been at work preparing for this very emergency. It is the Creator's own beneficient provision, for the health and comfort of the brute creation, that he has clothed the fields with verdure, and there is nothing so pleasant or healthful to the horse as the pasture.

PASTURING.

The horse that is not allowed a run on pasture in the spring is pretty sure to suffer in consequence. His condition will be likely to continue bad for months; yet, such is the invulnerability of Nature to the impressions of the most unfavorable external influences, that perhaps he may speedily recover from the effects of this deprivation. But it can hardly fail to come about that he will be more stupid than otherwise, and he often manifests his desire for the open air and sweet-scented grass by a restiveness and whickering while in the stable, and when out of doors by seizing every lock of grass within his reach.

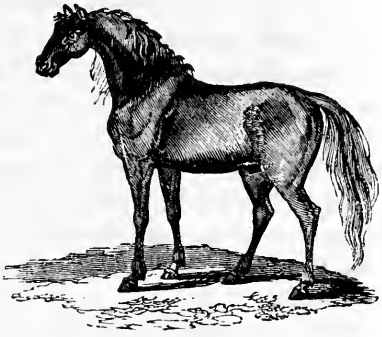


Pasture is the horse's natural food, as the open air is his natural stable and home. The horse domesticated is a slave; the stable is his prison; the bridle and harness are his chains and fetters; and much of his prepared food is unnatural, and not to be really relished, except by an appetite depraved by long habit. Even when pure, a great deal of his prepared food is not healthy. Much of it is very heating to the blood, and possesses a strong tendency to produce disease, so that very few horses fed exclusively upon it can be said to be entirely well.



To all these evils pasture is an antidote. It is both food and medicine to the horse, and he is hardly ever unwell when constantly at pasture. If he is costive, this will loosen his bowels; if his digestion is bad, the grass will regulate it; if his coat is rough and staring, there is the remedy; if the skin is tight and the joints are stiff, the grass will relax and loosen them—will cleanse the blood, open the capillaries, send out the oily fluids to the surface, and soon transform the poor jade into a fine horse, with glossy coat and nimble limbs.

Disease, except from accident, is but seldom a tenant of the pasture. Nearly all the disorders of the horse are generated in the stable, and were it not for the pasture in which they are sometimes permitted to run, hundreds and thousands of horses would be sick that are now in tolerable health. It is well that pasture is provided during one-half the year, so that the damage done in the stable during the other half may be repaired. There is no need that the latter should ever occur. And this leads us to speak of the different kinds of



GRASSES.

If more attention were paid to securing these for use during the winter, there would be less sickness among the farmer's horses. There is considerable diversity in the character and value of different grasses, some possessing a much greater proportion of nutriment than others. Others are especially adapted for pasture in the spring season, as they come up very quickly but do not last so well. They can not endure the heat and drouth of summer, but wither and dry up.

Other kinds of grass are more hardy; so that, although the old straw may die in August and September, they spring up again from the roots and seeds of the old stock. Such are the clovers, the herd's-grass, and some others. They drop their seed in the fall season, and these lie on the ground until spring. Then they come up, very small at first, but continue to grow, and become the fine, tender grass of the fall pastures. The roots of these are what shoot up and make the pastures of spring. Such grasses are termed *perennials*; that is, lasting more than two years.

There are many other species of the grasses that grow up rankly in the spring, but live only one season, and these are

the ones that constitute the class called *annuals*—coming yearly. They come from the seed in spring, but by fall they have withered and died. There are several varieties of them, prominent among which are millet, and the Hungarian and rescue grasses. The last of these is simply the cheat that is so troublesome in the farmers wheat-fields. When cultivated, it grows very thickly and finely, and for both pasture and hay is the most valuable among the annuals. It possesses more substance than any of the others, and previous to 1860, at least, was cultivated very extensively throughout the cotton States, to whose climate and soil it seems particularly adapted.

The perennial grasses do not thrive below the latitude of thirty-five, or the Southern border of Tennessee. None of the clovers succeed in the cotton States. The soil is generally sandy, and as it rains but seldom from June to November, the long summer drouths kill out the roots in most localities. All the perennials, in fact, that have been tried in those regions have proved to be failures, except on low, damp grounds. The winter grasses can not be made to flourish there. The only kind of grass that we have known to really succeed in the cotton States was the herd's-grass, of which we have repeatedly seen some fine fields, although rarely, if ever, except upon moist bottom lands, seeded when first cleared.

North of the thirty-fifth degree, the different perennials are all grown and flourish, modified somewhat by latitude and soil.

We will here enumerate the various kinds of grasses ordinarily cultivated throughout the West and South, specifying the relative value of each for grazing purposes, as also the latitude and soil best suited to them.

First among the many, and having a pre-eminence over all others for pasturing, is the *blue-grass* of Kentucky and Tennessee. It is a small, fine grass, growing about a foot high, with an abundance of small leaves at the bottom. The top, or seed, resembles that of the herd's-grass, but it is

smaller and has a brighter, greener, look; and there is this difference, also, between it and the herd's-grass, that it mats the ground very thickly with bottom leaves. It lasts through the winter, and, under favorable circumstances, the roots will not die for years. It sheds an abundance of seed in the summer and fall, and on soils adapted to its growth, if it once secures a hold, it will overrun the country far and wide; and fields, pastures, door-yards, and roadsides, all alike become carpeted with its soft, green texture. It is the most beautiful grass in field or yard that grows.

Blue-grass is also the most nutritious of the grasses, and very sweet, so that stock of all kinds feed upon it with great avidity, and thrive exceedingly. Upon limestone soils it grows and spreads almost spontaneously, but upon others is cultivated with considerable difficulty. North of the latitude of forty, or south of thirty-five, it does not flourish well. It does not grow high enough to be of much value for any other than grazing purposes, yet the tops may be easily cut off with the scythe, and the seed saved, in the months of June and July.

Next after the blue-grass, come the *clovers*—the white and red—which are so well known every-where that they need no description. To both of them there are some objections for pasture grasses. They act upon the salivary glands, and cause an excessive flow of saliva from the mouth, producing that debilitating and disagreeable affection known as slavering, or slobbering. The white clover is decidedly more objectionable in this respect than the red, and neither of them should be allowed the horse when he is at hard labor.

Although it is generally supposed to weaken the healthy animal's strength, if the horse is diseased or in low condition, nothing will be of more benefit to him than a run upon a good white clover-pasture. This increased action of the salivary glands, this slobbering, is not hurtful in his case, but just the reverse. The red clover, while less nutritious than the white, is more hardy, and in respect to quantity yields much better, whether of pasture or hay.

The *herd's-grass* and the *timothy* are next in the list. Neither of them are of much value for grazing purposes. The herd's-grass is the preferable of the two, from its more abundant yield, yet the other is the most nutritious. Either makes a very indifferent pasture, and one that does not last well through the season. One acre of well-set blue-grass is worth three times as much as either of them, if their qualities as pasture grasses are alone taken into consideration.

These are all the grasses that possess much merit for grazing purposes. The clovers grow in all latitudes north of thirty-five degrees, flourishing best on rich, dry uplands, and upon all soils about equally, excepting the sandy. This is also the case with the timothy, but the herd's-grass is particularly partial to low and moist situations.

HAY AND FODDER.

The grasses which are best for pasture are not so for hay. While the blue-grass stands at the head of the list, for the former purpose, timothy ranks first in respect to the other. It possesses more nutrition, and retains it better, when properly harvested, than any other grass. The herd's-grass comes next, but this has more juicy matter in its stalk, and of this much evaporates, of course, in drying. The white clover loses still more from this cause, and the red clover most of all. Good, ripe timothy loses only about one-fifth its weight in curing; herd's-grass, two-fifths; white clover, one-half, and red clover about three-fifths. In substance, they vary about the same, or in the proportions of from one to three; and as to healthfulness, although their relative values can not be determined with the same precision, they are to be esteemed in the same order, the timothy being much the best.

Many of the annuals make tolerable feed when well saved, but are not near so valuable as the grasses. They are often termed grasses in their green state, and when cured, hay; but we prefer to class them all as fodder. The rescue-grass is the best, being fully equal, if not superior, to the red clover

in substance, and decidedly excelling it on the score of healthfulness. Next is the Hungarian grass, which requires a rich soil and favorable season. The millet, which holds the third place in the list, is little better than wheat or oat-straw, except for the seed that it bears. A horse fed through a whole winter on this kind of fodder would almost starve to death.

Another kind of fodder, and one much more extensively used than any of the annual grasses, is the corn fodder, obtained by pulling the blades from the stalk, in the month of August, and, after allowing them to dry, binding them in bundles, and storing them for winter use. This possesses considerable nutrition, or rather substance, but is, undoubtedly, injurious in its tendency upon the health and general condition of the horse. It appears to dry up the blood in a most remarkable manner, and from its great brittleness—causing it to chop up easily into a harsh, dry powder—it is apt to harm the throat. It constitutes nearly the sole dependence for fodder in the cotton States, where all the fields of corn are regularly stripped of their blades, in August, for this purpose. To the extensive use of corn fodder we attribute much of the unhealthiness of the horse at the South; but this subject having been already discussed at some length, in our descriptions of big head, it hardly seems necessary to enlarge upon it here.

The different straws of wheat, rye, and oats possess a limited amount of substance—about one-twentieth as much as does good timothy hay; but they are so very dry that they can not be regarded as of much value to the horse. They may be used as chopped feed, with meal or provender; but the horse has such a disrelish for them in any other form, that he will not eat them until driven to it by starvation.

All these varieties of fodder and straw seem much better suited to the wants of other animals than the horse. For his use they are too dry, and tax the salivary glands too much in the process of mastication; and so with those agencies of the stomach which soften the food down into chyme. In giving such feed to the horse, it should always be chopped,

then moistened for an hour at least, and, finally, rolled in meal or provender. By this course, all its injurious effects upon the glands and throat will be entirely prevented.

Dry hay of all sorts should be prepared in the same way. Time can not be better employed than in providing moist feed for the horse to eat. To many the idea of chopping hay for the regular feed may seem novel, and, perhaps, amusing. But let the farmer try it for one winter, and note the improved condition of his horse, as well as the great saving of feed, and he will fully indorse the opinion that time can not be spent to better advantage. Corn-stalks and fodder, though they may be greatly improved by chopping, can not be made suitable food for the horse.

The condition in which the hay and fodder are secured is of the first importance. The grass should be cut about the time of maturity, or a little before, while still in bloom, and before it becomes dead ripe. Its juices are then just right to make the heaviest and best hay, which will keep better, remain sweeter, and be more palatable than if cut either earlier or later. If cut when quite immature, there is a lack of strength and sweetness, as well as a loss in weight; and if harvested after the period we have indicated, the hay is tougher, more woody in its texture, and neither so nutritious nor pleasant eating.

Another thing of essential importance, in regard to securing the hay and fodder, is to protect it from the weather, and as soon as it is dry to put it in the barn. If the sun shines, it is seldom that hay requires to remain out in the field more than twenty-four hours, and then it should be carried into the barn. "But," say some farmers, "what shall we do who have no barns?" That farmer is to be pitied who can not contrive some means of putting his horse's provisions under proper shelter. He has no business to own a horse, and ought to sell his stock to some better and more successful manager. It is as important to have a barn as a horse, and nearly as much so to keep the latter's provisions under shelter as those of his master. The horse's food can not be

allowed to remain out in the storm and weather, there to rot and spoil, without serious consequences to the animal's health. Weather-beaten, moldy, and mow-burnt hay and fodder are the sure instigators of disease; and in a large majority of the cases of urinary affections among horses, the trouble may be distinctly traced back to their use.

GRAIN.

It is necessary to feed the horse a proportion of grain. As a general rule, one-half the food given him should be of this character, but to this there are exceptions, of course. When the horse is in low condition or bad health, or when he is allowed but little exercise, the quantity of grain should be reduced; and, on the other hand, if his labor is severe and continuous, he will need a larger proportion of it than that here indicated.

There is even more difference in the quality and value of grains as food for the horse than in the various grasses, and the same is true in regard to the manner in which they are fed. There are but two kinds of grain that are used to any considerable extent in our country as food for the horse, and these are oats and corn. The former is fed principally in the Northern States, while in most of the Southern States corn alone is employed. Both are well known to every American farmer, and together they form the great staples of the land for feeding stock of all kinds.

For the horse, oats are much preferable to corn, under all circumstances. They are a milder, lighter diet, not so heating to the blood, and much more easily digested. They are generally not much more than half as heavy as corn, and possess less concentrated nutrition and substance. Although they can be fed with impunity, in their natural unbroken state, they are much better when ground into meal and used as provender. In this way, too, they can be used much more economically, one-third less sufficing to meet the wants of the horse. When the oats are fed whole, one-half of them are generally but imperfectly masticated in the mouth or

digested in the stomach. Grinding into meal remedies this difficulty entirely.

Corn is, in many ways, very objectionable as food for the horse. It is a gross, heavy diet, very heating to the blood, and having a strong tendency to the rapid creation of a lymph and fat that is never sound and healthy. It is the fruitful source of more diseases than all other kinds of unhealthy diet combined. It generates a list of disorders quite unknown in those countries where it is not fed to the horse at all, and many others that are common to the horse of all civilized countries manifest a malignity and fatality in America characteristic of them in no other land.

The horse can hardly ever be well when under full feeding of corn, which, however excellent for fattening hogs, is not the diet for a horse. The horse's structure is different, in many respects, from that of the hog, and the effects of high feeding are not the same upon both. Suddenly-formed flesh is never solid or healthy in the case of the horse; and our experience has taught us to regard corn as the cause of more difficulty and disease in veterinary practice, in some parts of America, than all other circumstances combined. Hundreds of young horses and colts, and many of them splendid specimens of the stock-raiser's success and skill, have we seen ruined by overfeeding with corn.

While writing these pages, a case is before us showing the evils of gorging a young horse with corn to put him in condition for sale. It is but a few days since that we were called upon to see a fine, young horse, in Petersburg, Boone County, Kentucky, valued at three hundred and fifty dollars, and actually sold for that sum, the animal to be delivered in a few days. In one of his eyes the water had a cream-colored appearance, and the other showed unmistakeable signs of disease. We bled him; but with a good fleam and a heavy blow from an unusually large stick, barely succeeded in penetrating the jugular vein. His skin was as hard and thick as the hide of a bull.

This horse had been suffering from a cutaneous (skin) fever

for a twelvemonth preceding, and now the disease was assuming all the phases of hide-bound. His kidneys and urinary organs were seriously affected; his sheath had become foul; his pulse was about fifty, and yet he was very fat. Right here was the trouble, in fact. He had been crowded with corn every day to make him fatter, until, finally, his eyes had fallen victims to the consuming fever of the blood and skin; and we gave as the diagnosis of the case, "Destroyed by corn." Thousands of similar sad instances have there been in the history of American agriculture and stock-raising. But perhaps some will suggest that the horse probably had "naturally weak eyes." This was not the case, by any means; we never saw a finer formed eye than his. There was no trouble there. The difficulty all proceeded from the injudicious feeding, which no horse of his age could bear without contracting disease of some kind. If we had seen the animal two months earlier, the mischief might have been prevented.

Many will doubtless be ready to inquire whether they shall not feed corn at all. We answer, "Yes—to your hogs and cattle, which it suits very well, but not to your horse, if you have any thing else to keep him upon; and if you must use it, the smaller the proportion of his feed which the corn makes the better it will be for him." It may answer very well to feed old horses on corn, at half feed, especially if the precaution be taken to keep a good supply of wood ashes always in the manger. Perhaps the chief difficulty consists in biting the corn from the cob. In the case of young horses, this keeps the teeth and gums sore, and develops the tendency to fever, which is especially strong at that age, and hence the greater extent to which they suffer than older animals.

A great many horses do not sufficiently masticate the grain, but swallow much of it barely cracked into pieces, or sometimes not cracked at all. Such food it overtaxes the stomach to digest; it heats and ferments, and then follow all the evil consequences of colic. But few young horses

fed on corn escape the annoyances, if they prove no worse, of a sour stomach and constant distension; nor do many older ones come into their feed of corn at night, after a hard day's work or a long drive, without suffering more or less from frequent disturbances of the digestive process.

Doubtless much of the evil effect incident to the use of corn might be obviated by having the corn ground, and then used as provender, allowing it to lie wet for half an hour before using to soak and swell. But this is too much work and trouble for the majority of farmers in this fast and busy age. These exemplify the proverb which speaks of "throwing out more with the spoon than they can bring in with the shovel." As we have repeatedly remarked, good wood ashes will prove of great benefit in connection with a regular diet of corn, since they tend to neutralize the acid condition of the stomach, and carry digestion forward in a healthful manner.

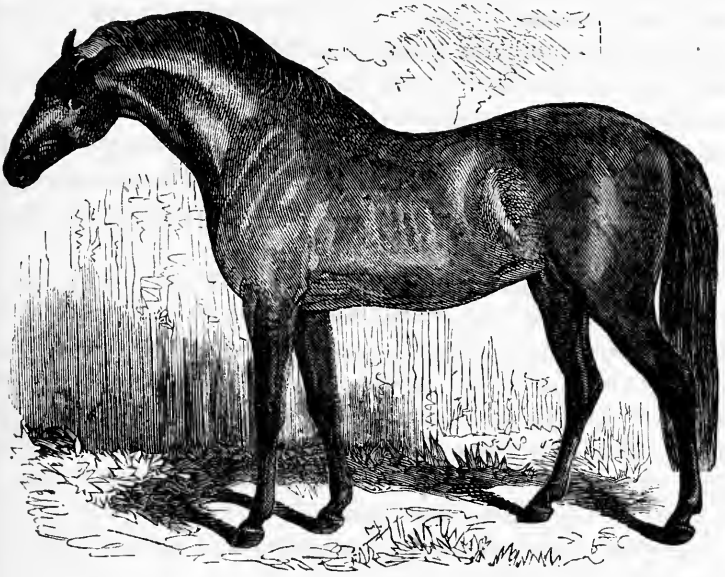
Barley may be used as half feed, but is nearly as objectionable as corn. Wheat-bran and rye should be used sparingly, as they act too powerfully upon the bowels to be used freely. They do best when mixed with oat or corn-meal as provender to go upon chopped feed.

GREEN FEED FOR WINTER.

It is the work of economy, and highly conducive to the horse's health, to provide for his use during the winter as much green feed as possible. He may be given carrots, turnips, beets, pumpkins, and potatoes with decided advantage. The first two of these are the best, but he will eat any green feed, even to cabbages and apples, with greediness, and all are excellent in their effects upon his health and general condition. Throughout the winter, every horse that is kept upon dry feed should have a green feed once a day. If this course was in general practice, fewer diseases would visit our stables, and fine, fat, lively horses and colts would multiply greatly.

We feed both our cows and hogs upon slop, and with this

treatment they are generally kept healthy and fat. Give our horses the benefits of a similar practice, and they will be as plump and sleek as one could wish them. The Arab feeds his horse upon the same substances that he eats himself; beginning with the colt, he trains the animal to eat whatever is given him; and we all know that the Arab has the finest horse in the world.



THE GODOLPHIN ARABIAN.

Two gallons of slop—of grease and salt, and the extract of vegetables which have been boiled in the liquid—will form both food and medicine. Colts may not only be taught when very young to relish such messes, but would partake of them with great and certain benefit.

GENERAL STABLE MANAGEMENT.

No division of our subject is of more importance than this. The fearful effects of bad stables upon the health and vigor of the horses of this country it would be almost im-

possible to compute. Many stables are but sinks of filth and rottenness—perfect lazarettoes—haunts of disease and death. The aggregate amount of disease and debility flowing from this source is absolutely incalculable.

It is not so much the farmer's stables that are in fault as some of those of the towns and cities. There, many a home provided for the horse is located in some back alley, in some low, damp, dark situation, where there is little room and still less light and air, and where great piles of manure are suffered to accumulate within and without, filling the whole atmosphere with their reeking fumes. There are a great many exceptions to this description, of course, and most of our city livery stables, especially, must be exempted from these charges. These are generally well built, conveniently arranged, and managed with a judicious carefulness that at once removes every thing offensive.

From the nuisance of the farmer's stables, his horse is each year allowed a considerable respite in the pasture. A great many stables in the country are neither built nor managed better than those pest-houses for the horse which we described in the last paragraph; but the surroundings are much more favorable. There are generally no other buildings close at hand to obstruct the free circulation of the air outside of the stable, and thus the dung dries up rapidly, while much of the unwholesome effluvia is carried away by the wind.

The construction of the stable—its size, form, etc.—is a matter of no small moment. Every horse should have his stall, which should be sufficiently large for him to turn round in it, and so arranged that he can lie down. Not only is it exceedingly tiresome to the horse to be compelled to stand continually upon his feet, but it often proves very injurious. Soreness and swelling of the joints often result from it, and not unfrequently these are aggravated into permanent stiffness. In many instances, a hurt of the leg or joint, received in his daily labor, would pass away without serious consequences were the animal allowed to rest his limbs by lying

down; but by constantly standing, an obstinate, if not incurable, disease sets up—spavin, ring-bone, or the like.

One of the first questions in practical importance, to be considered in the erection of a stable, is

LIGHT.

Light is essential to the growth and development of every object in the world that has existence in an organized form. Life of no kind, whether animal or vegetable, can prosper without it. The tiniest spear of grass must have light, or it loses its color and substance; and the same law is true, without variation, throughout all the higher types of organism in the animal and vegetable kingdoms alike.

The importance of light to the material world can hardly be conceived. Without light there could be no heat, so that our world, under that deprivation, would not only be in perpetual darkness blacker than midnight, but it would be a frozen chaos. Light is the stimulating agent that causes every thing upon the earth's surface to bud and spring forth, clothing the valleys with verdure, the plains with waving fields and ripening orchards, the hill-sides with towering forests, and making the whole face of Nature a panorama of unceasing, yet ever-changing, beauty and gladness. Life is dependent upon it no less for preservation than for creation and development. Nothing can continue to live without it; and while it is true that animals and plants can not live upon it, it is equally true that they can not live without it. All living creatures—the whole of animated Nature—should be permitted to enjoy it freely at such times as the beneficent Creator has arranged to furnish it to the world. To deprive any animal of light will be to materially injure it, and prove the occasion of disease, if not of death.

What, then, must be the condition of that horse whom the ignorance, the heedlessness, or the parsimony of his owner condemns to dreary confinement, for a great part of his time, in a dark, close stable? How can the effect be otherwise than highly detrimental? Such we always find it to be. To say

nothing of other diseases either originating in this cause, or aggravated by it, the number of horses that have lost their eyesight in dark stables is a matter almost incredible. To this wretched defect in the care bestowed upon the animal, nearly all cases of moon-eyes may be referred in less or greater degree. No horse can permanently retain unimpaired vision if deprived of light during the day. The eye is naturally the first and greatest sufferer from this deprivation, as this is the organ especially adapted to the conditions and enjoyment of light. When brought suddenly out into the glare of day, the horse which has been kept in a dark stable is dazzled and confused by the overpowering brightness, so that it is some time before he is enabled to see as well as usual. Every time this takes place, the trouble is apt to increase, and continue longer than before. By and by, when some fever arises, it fixes its hold upon the eyes, which begin turning white; and then the alarmed owner anxiously inquires, "What is the matter with my horse's eyes? He seems to be going blind." To such let us say, emphatically, "Your dark stables have done it."

No special directions can be minutely prescribed concerning the best means of admitting light into the stable. Upon this point the intelligent owner must exercise his own judgment and taste. No rule could be given, unless all stables were built alike. But, in general terms, it may be laid down that the light should be somewhat higher than the horse's head—behind him rather than in front—and that, as to the quantity admitted, the stable should be kept nearly as light as it is out-doors. No stable, it may be added, should be whitewashed inside, unless it is impossible to light it from without.

VENTILATION AND TEMPERATURE.

Another matter of prime importance in the construction of a home for the horse is an abundant provision for furnishing it with pure air; yet, while ventilation is thus essential, some arrangement must be adopted for protecting the horse from the cold in winter. Ventilators and windows, as

a rule, should be placed higher than the animal's head. The flooring and sides of the building should be air-tight, or, if the sides can not be made so all the way up, this end should be secured in their fitting together for at least several feet from the floor. This is to prevent the cold winds from blowing directly upon the horse. Many stables are so open that the winds can blow through the large open cracks in the sides and floors with stinging keenness, and then the horse, fastened in his stall so as to have no exercise whatever, becomes chilled throughout his whole frame, and colds, with most serious lung or constitutional affections, are frequently brought on. The horse is probably more likely to take cold upon any dry, cold night, when housed in such a stable, than if he were running shelterless upon the common; because in the latter case he would be pretty sure to avail himself of his freedom to move about, and this exercise would help to keep him warm.

On the other hand, close, hot stables are most decidedly objectionable. Except in very cold weather, the atmosphere within the stable should not be kept more than ten or twelve degrees above the temperature out of doors. It is not desirable to make the building warm, so much as to shut out the cold currents of air. This extremely unhealthy condition of the stable is much more common in the city than in the country, and was formerly a still more prevalent evil than it is now.

A number of horses shut up in a narrow, close stable produce, by their breathing, a most deleterious change in the character of the air. Each pair of lungs throws off an immense amount of carbonic acid gas, and with this the atmosphere in a small, tight apartment soon becomes so greatly surcharged as to be absolutely poisonous. Yet how many stables are there in the United States, as elsewhere throughout the civilized world, in which a most disproportionate number of horses are shut up all night, and much of the day besides, with no aperture left open for the escape of the foul, fetid air, or the admission from without of that which is fresh and cool.

Says Youatt, in treating of this subject: "What is the consequence of all this? Why, if one thought be bestowed on the new and dangerous character which the air is assuming, it will be too evident that sore throat, swelled legs, and bad eyes, and inflamed lungs, and mange, and grease, and glanders will scarcely ever be long out of that stable."

Taken out of one of these hot-houses into the open air, often standing for hours in the streets fastened to some hitching-post, while his master, within doors, is comfortably toasting his shins before a blazing fire, the horse will be almost sure to take cold. The pores are open, the system is relaxed, and altogether the animal is in a poor condition indeed to withstand the cold and exposure.

In putting up a stable, the number of horses which it is designed to accommodate should be taken into careful consideration, and the building be made as commodious and airy as possible. A stable for six horses should be about thirty-six feet long, sixteen feet wide, and twelve feet in height to the loft, if there be any. The loft should not extend to the side of the stable back of the horses, but a considerable space, as much as three feet, should be left for the foul air of the stable to ascend, and openings should be provided under the plates for the escape of these gases. This is the most judicious plan of building a stable, having it wide, so that there may be a row of stalls upon each side, with abundant space for the passage of all the foul air generated below up to and out under the roof.

Another very important matter is the immediate removal of all impure substances which may be found in and about the stable, of what kind soever. The practice, common in some sections, of throwing the manure under the stable should be abandoned at once. When the building is situated on the side of a hill, so that the back part is considerably elevated above the ground, it will be very convenient to throw out the manure behind. There can be no objection to this procedure, if the manure be at once removed in carts, as it should be in all cases.

Give the horse plenty of light in his stable, with an abundance of pure, fresh air, and one half of the diseases which now infest the habitations of our horses will entirely disappear "Of nothing are we more certain," says Youatt, "than that the majority of the maladies of the horse, and those of the worst and most fatal character, are, directly or indirectly, to be attributed to a deficient supply of air. Each of these evils is to be dreaded—each is, in a manner, watching for its prey; and when they are combined, more than half of the inmates of the stables are often swept away."

While the entire system of the horse becomes impaired by his confinement in close, damp, dark stables, some particular organ or member generally suffers much more than the others. In regard to the feet, a number of ailments may thus be produced—hoof-rot, scratches, thrush, cracked heels, swelled legs, and others of the same class; while on the skin appear surfeit, mange, hide-bound, stiff complaint, and warts, with vermin innumerable. But perhaps the eyes are most of all affected by the deprivation of light and the effects of foul air, especially of those pungent fumes of ammonia which are continually arising from the urine and the piles of hot and steaming manure. We sincerely believe that three out of every five cases of bad eyes which occur in our country proceed from these causes. Let this admonish our farmers and stable-keepers generally to remedy these evils at once, if such exist upon their premises.

FLOORING.

The kind of flooring upon which the horse stands, for months or years together, is a consideration of some importance to every owner or keeper of a horse, who regards the animal's health and comfort as well as his own convenience. There are three kinds of floors in common use throughout American stables, which we name in the order of our preference, as follows: The dirt or gravel floor, the wood or plank floor, and the flagstone or pavement.

The horse prospers best on the dirt or gravel floor. It is

not so hard as the others, and is both cooler in summer and warmer in winter. The only objection to it is the loss of a great part of the urine, which, when mixed with the dung and straw, forms the most valuable part of the compost for manure. Earth floors should be raised five or six inches above the level of the general surface, and are best when made of sand or fine gravel. One of their manifest advantages is the ease of the horse's legs and feet, on account of their softness and coolness; and another is their economy, their cheapness. It is but seldom that any other floors are met with south of the Ohio and Potomac, and no other kind is ever seen on the plantations of the cotton States. At the South they are believed to be much more conducive to health than any other.

The plank floor is in general use at the North. In a cold climate it is regarded as a protection from the frost supposed to gather on the top of the ground, which thus becomes cold and damp. These considerations have no weight at the South, where the cold is rarely severe enough to freeze the dirt floors. Our experience at the North is too limited to enable us to pass any judgment upon the correctness of these views as an objection to the earth floor. Plank floors are very hard for the horse to stand upon, and, unless made quite tight, are apt to be cold in winter. Many of the barn-stables in the Northern States are merely loose floors, quite unjointed, through whose chinks and cracks the cold winds come up in piercing currents, and the horse suffers not a little in consequence. They are usually so high from the ground, too, that in summer they are very warm.

The pavement floor, which is used only in cities, except for its hardness, is quite unobjectionable. But this is not felt as so serious a disadvantage where the horse spends most of the day upon the hard pavements of the streets; and in many large stables floored in this manner, a coating of saw-dust makes the surface soft and pleasant to tread upon. Such floors are very cool in summer.

Whatever the kind of floor adopted, it should be laid

entirely level, as otherwise the horse can not habitually stand easy and comfortable. The construction of some floors, by which they are made to slant backward from the manger, is altogether wrong. Its unpleasant effects upon the horse may be understood from the simple experiment of standing three or four hours with one's toes an inch or so higher than his heels.

Let the floor, we repeat, be level, as dry as possible, and, by frequent sweepings, kept perfectly clean, with litter and bedding often changed.

BEDDING.

This is often called litter, but what is really needed is a bed for the horse to lie down upon in his stall. The latter should not only be roomy enough, and so arranged that its inmate can lie down in it, when so disposed, but it should always be spread with a good, clean bed of straw, or some proper substitute, such as that most excellent one saw-dust. No matter what is used, however, the portions wet by the urine, and all the manure, should be removed every morning, and if the horse stands in the stable during the day, at evening also. The urine and the soaking straw decompose very rapidly, and give off large amounts of offensive vapors, especially of the injurious fumes of ammonia, or hartshorn, and hence they should be removed frequently. In many of our best stables, this is done every few hours—an excellent regulation, worthy of adoption every-where.

The bedding should not be too thick, or so as to cover the feet of the horse, as this tends to heat them, and thus induce inflammation and disease. Two inches of bedding, of whatever sort, will be ample for any season of the year. As an act of humanity, it is due the horse that he be given a bed to both stand and lie down upon in his stall. A perceptible difference may be discovered between the condition of a horse that stands continually upon a hard floor, and that of another who has a good bed provided for his use at all times. In winter a sufficiency of bedding will do much to counter-

act the evils of an open plank floor, between whose joints the cold currents of air are always rushing up, not only to the very great discomfort of the horse, but also to the material detriment of his health.

CLEANSING AND CURRYING.

The proper use of the curry-comb and brush may be called the sheet-anchor of all good stable management. There is never too much of it, and but seldom half enough. When the horse is allowed his liberty in the pasture, he will curry himself pretty well, against the fence-posts and trees, while the water from the rain-cloud will wash him off. If we deprive him of his liberty, and shut him up in the stable, we ought to do this much for him; and then, too, he needs this attention more in the stable than when running in some dry pasture. All horses kept constantly in stable, require constant cleaning and currying, and this is still more necessary in the case of those that are driven or ridden in the mud and rain. It is a disgraceful act of inhumanity to push the faithful horse over bad roads, then turn him into the stable, and let him remain until morning, or perhaps still longer, with not only his limbs covered with dirt, but his whole body bespattered with mud. No person has a right to treat the horse in this manner. It will afford the poor animal nearly as much satisfaction to be freed from these accumulations of filth, as it does the negligent, unfeeling owner.

Cleanliness is also highly conducive to the health of the horse. The darkness and confinement of the stable are not favorable to the action of the pores of the skin. These little vessels do not throw out their oily secretions to the surface with the same readiness as when the horse lives in the open air; neither do the dead particles of the cuticle, or scarfskin, detach themselves at the proper time with equal freedom. Sunshine, breezes and showers have the effect to loosen the scurf, and to soften the skin; and for these reasons the horse running regularly in pasture needs but little attention in this line. In the stable, however, Nature needs assistance,

and the curry-comb and brush, with the addition in summer-time, of the tub of cold water and a good sponge, will be of essential service, and in some degree ameliorate the animal's prison-life. Many horses kept in stables suffer from a constant fever of the skin, and for this trouble good currying is a most excellent remedy. It acts as a counter-irritant and affords great relief.

The difference between the appearance of a horse that is habitually well rubbed down, and that of one in whose keeping this is neglected will be very perceptible to the least observant. No intelligent keeper of the horse but is well aware how greatly hand-rubbing excites the secretions of the skin upon the legs, and causes the hair to shine with unusual glossiness. The skin is warmed and made pliant by the rubbing, the unctuous fluid flows forth, and the whole surface is oiled from Nature's own fountain. In all diseases of the skin, rubbing and currying is quite as essential a part of the treatment as medication, and very often even more so.

This being so important a branch of stable management, and the subject one of such universal applicability, we introduce the remarks of Youatt, upon the same topic:

"Of grooming, there need not much be said to the agriculturist, since custom, and apparently without ill-effect, has allotted so little of the comb and brush to the farmer's horse. The animal that is worked all day, and turned out at night, requires little more to be done to him than to have the dirt brushed off his limbs. Regular grooming, by rendering his skin more sensible to the alteration of temperature and the inclemency of the weather, would be prejudicial. The horse that is altogether turned out needs no grooming. The dandriff, or scurf, which accumulates at the roots of the hair, is a provision of Nature to defend him from the wind and the cold.

"It is to the stabled horse, highly fed, and little or irregularly worked, that grooming is of so much consequence. Good rubbing with the brush or the curry-comb opens the pores of the skin, circulates the blood to the extremities of

the body, produces free and healthy perspiration, and stands in the room of exercise. No horse will carry a fine coat without either unnatural heat or dressing. They both effect the same purpose. They both increase the insensible perspiration; but the first does it at the expense of health and strength; while the second, at the same time that it produces a glow on the skin, and a determination of blood to it, rouses all the energies of the frame. It would be well for the proprietor of the horse if he were to insist—and to see that his orders are really obeyed—that the fine coat, in which he and his groom so much delight, is produced by honest rubbing, and not by a heated stable and thick clothing, and, most of all, not by stimulating or injurious spices. The horse should be regularly dressed every day, in addition to the grooming that is necessary after work.

"When the weather will permit the horse to be taken out, he should never be groomed in the stable, unless he is an animal of peculiar value, or placed for a time under peculiar circumstances. Without dwelling on the want of cleanliness, when the scurf and dust that are brushed from the horse lodge in his manger, and mingle with his food, experience teaches that, if the cold is not too great, the animal is braced and invigorated to a degree that can not be attained in the stable, from being dressed in the open air. There is no necessity, however, for half the punishment which many a groom inflicts upon the horse in the act of dressing; and particularly on one whose skin is thin and sensible. The curry-comb should, at all times, be lightly applied. With many horses, its use may be almost dispensed with; and even the brush needs not to be so hard, nor the points of the bristles so irregular, as they often are. A soft brush, with a little more weight of the hand, will be equally effectual, and a great deal more pleasant to the horse. A hair-cloth, while it will seldom irritate and tease, will be almost sufficient with horses that have a thin skin, and that have not been neglected. After all, it is no slight task to dress a horse as it ought to be done. It occupies no little time, and demands consider-

able patience, as well as dexterity. It will be readily ascertained whether a horse has been well dressed by rubbing him with one of the fingers. A greasy stain will detect the idleness of the groom. When, however, the horse is changing his coat, both the curry-comb and the brush should be used as lightly as possible.

"Whoever would be convinced of the benefit of friction to the horse's skin, and to the horse generally, needs only to observe the effects produced by well hand-rubbing the legs of a tired horse. While every enlargement subsides, and the painful stiffness disappears, and the legs attain their natural warmth, and become fine, the animal is evidently and rapidly reviving; he attacks his food with appetite, and then quietly lies down to rest."

CHANGES OF WEATHER AND TEMPERATURE.

Nature prepares the horse, as it does all the other members of the animal creation, for the changes of the seasons—from heat to cold, and from cold to heat. There is a wonderful provision for this purpose, in the arrangement of the varying conditions of the skin—the opening of the pores as summer advances, and their closing upon the approach of winter. Another admirable adaptation of conditions to surrounding circumstances is exhibited by the growth of the hair in the fall season, when it is soon to be needed for the protection of the animal from the rigor of winter, and then by its gradual shedding in the spring, when it is needed no longer.

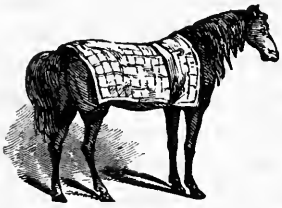
These changes are rarely attended by any inconvenience to the horse, much less any serious ills; but there are other changes created by man, his master, that often very much affect his health and condition. Taking him out of a warm stable into a cold, beating rain, or into a sharp atmosphere, crisp with a biting frost, constitutes one of these unfavorable changes. Another is driving him very hard and then hitching him to a post in the cold or storm, without any protection, and thus allowing him to remain until his whole frame is numb and chilled with the cold. Another is turning him

into an open lot, to spend the night in the rain, sleet, mud, or snow, after several hours or an entire day of severe exercise. There are many more such dangerous transitions, most of them downright abuses; but we have room to specify only one additional, and that is bringing the horse suddenly into a hot stable from a wintry atmosphere without, so cold that he has been half chilled to death.

To all these changes the horse is often exposed, and, in consequence, often falls a victim to those diseases which they have a tendency to produce, especially affections of the lungs, the skin, and the feet. If we are compelled or choose to place our horses in such circumstances, we ought to afford them all the protection in our power. If the animal has long to wait upon our necessity or our pleasure, it would be much better to procure a stable for him to stand in meanwhile; but if this can not be done, it would be an act of both humanity and economy to afford him the warmth and comfort of a good

BLANKETING.

No better investment can be made than the purchase of a good, thick, and substantial blanket for the horse's use during cold and stormy weather. It should, of course, be fitted with straps and buckles in front, behind, and beneath, just back of the fore-legs.



A gum-elastic blanket might be so constructed as to be thrown over the horse and cover the entire harness or saddle. This will protect the latter from the weather as well as the animal himself. It would be easy to arrange it so that the horse could travel with this covering, leaving but a small portion of the harness exposed at all.

In a state of Nature, and upon ordinary occasions, even in his domesticated condition, the horse is sufficiently provided for by his natural clothing—the hair.

It is only when his blood has become unusually heated by severe exercise, or when he is suddenly plunged from one extreme of temperature into the other, or when he has become enfeebled by disease, that the horse needs any extra covering, unless the weather is extraordinarily cold. Protection to the horse is only needed to modify his condition, and to counteract the unhealthy influences of great and sudden changes.

DISINFECTANTS.

Disinfectants should be used in all stables, more or less. The larger ones, in which many horses are crowded together, are those which, most of all, need systematic and frequent repetitions of the disinfecting process. The livery stable is never properly kept unless an intelligent, liberal use of disinfectants forms one feature of its management. No horse is entirely safe in a stable filled with strange horses unless this course is pursued. It is of quite as much importance to the farmer coming to town with his produce, or the traveler of any sort away from home, to know that his horse is not to be infected with some terrible contagion, as it is to be sure that he has plenty of food and proper attention.

Glanders, farcy, and distemper often take possession of a stable covertly, weeks before the majority of hostlers can detect the presence of any thing wrong. In stables where strange horses are going and coming every hour, there is no assurance that an infected animal has not been thrust in among the rest. Perhaps a glandered horse, with the disease in its incipient stages, may come into a large stable full of horses, and not more than two or three of the whole number take the dreadful malady from him. Yet whose horse is safe in such company? If proper disinfectants have been used, there will be little danger.

There are but three articles commonly employed as disinfectants that possess much value in the stable. We mention them in the order in which we esteem them, thus: tobacco, sulphur, and lime.

For stable purposes, we consider tobacco the best disinfectant known. It is the antidote of glanders, farcy, and distemper; and if it be used in the manner prescribed elsewhere for the treatment of those diseases, the spread of contagion can be effectually prevented. Every contagious disease, in either man or beast, has its particular disinfectant—that is, one better adapted to counteract its peculiar influences than any other substance. All disinfectants are not of equal power, when applied to the disorders of man, that they possess when used in veterinary practice, and *vice versa;* but, in either case, a perfect disinfectant is the best remedy for the disease. Reversing this proposition, it may be said that the best remedy for the disease is the only sure disinfectant.

Tobacco will cure glanders, in its first and second stages, when other modes of treatment utterly fail; and it is the only substance that can be considered a certain disinfectant of this fearful disease. A few stalks or leaves of "the weed" burned in an old kettle in the stable, when the horse is attended in the morning, will work wonders in improving the sanitary condition of the building, if any infection either happens to be lurking there undiscovered, or is already in full, fell play. Unlike some disinfectants, tobacco does not materially change the qualities of the infected atmosphere; but its virtue consists mainly in its action upon the system of the animal whence the infection proceeds, destroying, or at least neutralizing, the very source of danger, the poison of disease.

Sulphur has been known to the author of this work for more than fifteen years as a disinfectant of great value for those types of malignant disease which generate foulness and putridity within the system; and this is one reason why its free use internally has been so often and persistently prescribed in many of the foregoing chapters. It has lately been employed as a disinfectant by fumigation, also. When it is burned in the atmosphere, sulphurous gas is formed, which is believed to be of great benefit in counteracting contagious influences. But whether it will destroy the virus of glanders or distemper yet remains to be tested. We are confident

that tobacco will do this, having used it repeatedly with the greatest success; for which reason tobacco is what we recommend in all such cases.

Lime is a highly-esteemed disinfectant when employed to nullify the noxious effluvia arising from the decomposition of vegetable matter; for instance, in the vicinity of sewers, stagnant pools, piles of manure, and heaps of rotting garbage. Chloride of lime, or lime itself, placed in these localities will disinfect them to a very great extent. Hence, the exhalations from a box or kettle of the chloride will be of great value in neutralizing the odors and injurious gases in the stable proceeding from rotting manure and the like causes; but it does not appear to have any power to destroy or break up disease.

In a stable where any contagion is known to have lately existed, tobacco may, perhaps, be regarded as the only real safeguard; yet this remark must not be understood as pronouncing against the use of either lime or sulphur in connection with it. They may be employed with benefit as medicine, and probably as fumigators, also. Every part of the stable near which the infection may possibly have been, should be thoroughly washed with a decoction of tobacco. A dense smoke of the same should form the fumigation, and tobacco-leaves—the finer the better—should be kept for a time in all the mangers of that stable.

Other disinfectants, such as copperas, chloroform, assafetida, etc., have had their advocates; but the three which we have named are the principal agents of this character, and the others are not to be used, except in special cases.

EXERCISE.

If it be at all possible, horses should have regular, daily exercise in some way. The farm-horse generally has enough of this in the routine of daily toil. It is only the horse that is kept for pleasure which spends most of his time in the stable. Such an animal has great need of set periods, at regular and frequent intervals, for exercise; otherwise his legs are apt to

become stiff, and swellings puff out the joints. Exercise improves condition and spirits, and is often a preventive of disease. It should be moderate; for the class of horses which we have described are not capable of undergoing such fatigue as would seem quite easy to the farm or wagon horse, not having the same hardness of muscle nor equal powers of endurance.

Great care should be taken not to put horses that have been idle for some time to severe exercise too suddenly. Great evils have followed this injudicious course, and, in many instances, the loss of the horse too late has opened the eyes of the owner to its folly. The remarkable case of lock-jaw, described on page 203–205 of this work, occurred while the author was engaged in preparing the first draft of the present chapter, and fully illustrates what we wish to say in this connection.

Many farmers pursue a course similar to the one described in that narrative, in overworking horses unaccustomed to hard service; and though lock-jaw may rarely follow, they are lucky, indeed, if no other disease fastens itself upon their abused and jaded animals. In consequence of such mismanagement, not a few of the best horses ever bred have failed; while, if they had been the subjects of a little consideration and judgment, such as would have put them to work gardually, and have increased the amount of labor exacted from them as they were able to bear it, they might have continued to do excellent service for a whole lifetime without any suffering in becoming inured to protracted and severe toil.

In the case of lock-jaw referred to above, it was a great mistake to put the young mare to such hard work in the hottest days of August. More favorable results ought not to have been anticipated. The best time for accustoming the young draft-horse to the labor which is to be demanded

of him is in spring, beginning early in the season; and next to this period, the cool days of fall. Many a horse has been brought from the stable or the pasture, either after a long rest, or else having never worked at all, and then, being put at once to hard service, has failed, upon which the owner has been apt to think himself cheated in his bargain; whereas a more judicious management might have led to a full realization of all his expectations, and have secured him the labor of a valuable animal for many years.

Our English author, (Youatt,) although mainly addressing other classes of horse-owners than the farmer, is very clear and satisfactory in his treatment of this subject. He says:

"Our observations on this important branch of stable-management must have only slight reference to the agricultural horse. His work is usually regular, and not exhausting. He is neither predisposed to disease by idleness, nor worn out by excessive exertion. He, like his master, has enough to do to keep in health, and not enough to distress or injure him; on the contrary, the regularity of his work prolongs life to an extent rarely witnessed in the stable of a gentleman. Our remarks on exercise, then, must have a general bearing, or have principal reference to those persons who are in the middle stations of life, and who contrive to keep a horse for business or pleasure, but can not afford to maintain a servant for the express purpose of looking after it.

"The first rule we would lay down is, that every horse should have daily exercise. The animal that, with the usual stable-feeding, stands idle for three or four days, as is the case in many establishments, must suffer. He is predisposed to fever, or to grease, or, most of all, to diseases of the foot; and if, after three or four days of inactivity, he is ridden far and fast, he is almost sure to have inflammation of the lungs or of the feet.

"A gentleman's or tradesman's horse suffers a great deal more from idleness than he does from work. A stable-fed horse should have two hours' exercise every day, if he is to be kept free from disease. Nothing of extraordinary, or even

of ordinary labor can be effected on the road or in the field without sufficient and regular exercise. It is this alone which can give energy to the system, or develop the powers of any animal.

"How, then, is this exercise to be given? As much as possible by, or under the superintendence of, the owner. The exercise given by the groom is rarely to be depended upon. It is inefficient or it is extreme. It is, in many cases, both irregular and injurious. It is dependent upon the caprice of him who is performing a task, and who will render that task subservient to his own pleasure or purpose.

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"Nothing is so common and so preposterous as for a person to buy a horse from a dealer's stable, where he has been idly fattening for sale for many a day, and immediately to give him a long run after the hounds, and then to complain bitterly that he has been imposed upon if the animal is exhausted before the end of the chase, or is compelled to be led home, suffering from violent inflammation. Regular and gradually-increasing exercise would have made the same horse appear a treasure to his owner.

"Exercise should be somewhat proportioned to the age of the horse. A young horse requires more than an old one. Nature has given to young animals of every kind a disposition to activity; but the exercise must not be violent. A great deal depends upon the manner in which it is given. To preserve the temper and to promote health, it should be moderate at least at the beginning and the termination. The rapid trot, or even the gallop, may be resorted to in the middle of the exercise, but the horse should be brought in cool. If the owner would seldom intrust his horse to boys, and would insist on the exercise being taken in sight or in the neighborhood of his residence, many an accident and irreparable injury would be avoided. It should be the owner's pleasure, and it is his interest, personally to attend to all these things. He manages every other part of his concern, and he may depend on it he suffers when he neglects or is, in a manner, excluded from his stables."

CHAPTER XVIII.

BREEDING, STOCK-RAISING, ETC.

If the relative importance of the different branches of our subject had alone decided the arrangement of this volume, this chapter might properly have been placed at the very beginning of our work. We have here to consider not merely the birth of the young animal, but, likewise, all the circumstances having a bearing upon that event, and then to trace the history of the colt onward to his years of strength and maturity.

We enter upon this portion of our task not without some misgivings. A mistake in this department would be more fatal, would do more harm, than a blunder almost anywhere else. Then, too, every novice in the business of stock-raising is satisfied that he knows pretty nearly all that is to be known concerning it, and can hardly be instructed in any particular. Next to politics, this subject is probably the most common topic of discussion among the majority of our farmers. Nor is the importance which they attach to it by any means an undue one. As a general rule, nothing can progress satisfactorily or end well that does not begin aright.

As man has taken this matter, as far as he can do it, out of the hands of the Creator, and has assumed to direct and control it, he should have the full benefit of all the light and experience which is attainable in regard to it. Doubtless our views will call forth some adverse criticism, and, in some quarters, perhaps strenuous opposition. Nevertheless, we propose to state them fully and candidly, so that, while it is too much to expect that all will be convinced, no one need misunderstand upon what grounds our opinions are based. The reason for the faith that is in us shall be given clearly, as it has been deduced from long observation and experience.

In regard to breeding, many things in the customary system of operations are objectionable in the extreme. The manner of waiting upon the horse upon occasions of his service to the mare, with a crowd of idle boys standing about, and an attendant to direct the horse's movements, merits the opprobrium of all right-thinking persons. It not only shocks every sense of propriety, but it is unnatural and injurious. The practice deserves universal execration. Other portions of the brute creation are allowed to choose their own times and seasons for copulation, and to conduct matters in their own way, as they are abundantly able to do without any further guidance than the promptings of instinct alone. The horse should be privileged to enjoy the same freedom.

In precise terms, both the horse and mare should be allowed to run together in the same field. This, of course, should be retired from the highway, in some pasture which may easily be selected, away from the usual routes of the passers-by. Here the mare may be afforded the pleasure of the horse's society for several days—a circumstance which will be greatly to the advantage of both of them, and still more to their future progeny.

There is a radical error in the prevalent mode of conducting all these proceedings. We lay it down as an almost invariable rule, that the foal will partake chiefly of the constitution and disposition of the sire, while his form and size is mainly derived from the dam. It is the operation of this law which indicates the necessity of other treatment in regard to the horse. There are, by far, too few horses kept as breeders, and they are taxed beyond all reason and decency.

The horse is injured by being kept too close in a dark stable, without sufficient exercise in the open air and the range of the pasture; and then, too, his stable-feed has a tendency to heat the blood, which is a condition that often affects the genital organs materially. Constant confinement renders his disposition fierce and intractable, and the deprivation of the daily society of the mare makes the matter still

worse, so that when he is led out to meet her he is all of a frenzy and fever, and can hardly be controlled. This is all wrong, and would not occur were he in constant association with the other sex. He would, in that case, be much more docile, quiet, and manageable. As it is, he is by no means manifesting such a disposition as is desirable for the ordinary purposes for which a horse is needed; yet this is the disposition that will be imparted to the foal.

Another most serious error in the general practice at the present day has been already adverted to, and that is compelling the horse to serve too many mares. Not a few stallions in this country are forced to serve from sixty to seventy mares during the season of about three months, often being led out two or three times in the same day. No horse can be thus excessively taxed without manifest injury resulting therefrom. To discharge this duty regularly once a day is more than should be exacted from him. Every other day is as often as any horse is competent to meet these continuous demands.

Here comes in the rule that every writer upon the horse reiterates, and nearly every petty breeder thinks he knows all about, that "like produces like." It is unquestionably established that conception is the result of the mingling of certain elements to which both animals contribute. It is probable that the seminal fluid of the horse forms the first substance of the fœtus, while a small particle of blood with the ovum of the mare communicates the principle of life. This is considered to be the case with all red blooded animals.

It is a correct rule that to end well, any process must begin well; and no one will dispute the statement that the superstructure can not be firm and strong unless the foundations upon which it rests have first been made the same. With ordinary prudence and management a good beginning may reasonably be expected to make a good ending, but a bad beginning it will be exceedingly difficult so to reconstruct as to make it eventuate in success. Upon these principles, we repeat, do we base our objections to the un-

natural and absurd practices which characterize the system commonly pursued by stock-raisers in relation to breeding. That system we regard as utterly ruinous to all prospects of future improvement; nay, more than this, as the actual cause of great deterioration, from one generation to another, of the American horse.

We say, without fear of successful contradiction, that three times a week, or every other day, is as often as any horse should be permitted to serve a mare. Oftener than this, coition may be effected, it is true, but the seminal fluid of the horse in such cases is thin and immature; and if a colt is produced at all, he will be almost sure to be big-boned, loose-jointed, of flabby, uncompact muscle, and with a feeble constitution. This is one main reason why only a few of the colts gotten by fine stallions are equally fine, some partaking of his qualities scarcely at all, and the large majority falling far below the standard of his own excellence. No matter how favorable the condition of the mare may be, the foal gotten under such circumstances can not be expected to prove otherwise than a weak and feeble little creature. The condition of the dam will, doubtless, modify the application of these principles to some extent, but by no means sufficient to disprove their general correctness. The few fine colts which the horse sires are the result of procreation when his vital and reproductive powers were mature and vigorous.

Were proper attention paid to this matter, failure to impregnate would occur much less frequently than it now does in the ordinary experience of stock-raisers; the object of copulation would be accomplished three times where, under the reverse circumstances, it is effected once.

The great obstacle to improvement in this department consists in the fact that, with few exceptions, the stallions kept for breeding purposes are in the hands of men whose sole object is to make money, and whose interest it is, therefore, to have their horses serve as many mares as possible during the season. To most men of this class the future

race of horses in general is a matter of small consideration. They are quite satisfied if they can find two or three colts with fine parts to parade before the public as specimens of the foal-getting qualities of their stock; and how industriously are all such colts hunted up and decked off for exhibition at the county fairs! What does many a groveling fellow, who has adopted the profession of a horse-keeper, care for the general improvement of the race if he can, by any means, no matter how unfairly, keep up the reputation of his horse sufficiently to secure a liberal patronage the next season! What cares he so long as he can scrape together a few more of the almighty dollars, notwithstanding the community be imposed upon, and the next generation of horse-flesh be ever so much cursed by these excesses! The system is wrong from first to last—a blight and mildew upon one of the most important interests of agriculturists and the public generally.

But what shall be done to get rid of this nuisance—this imposition? Customs so firmly rooted are not easily broken up, and yet these pernicious practices may be done away with, if the mass of farmers were firm in their determination upon this point. Let neighborhood meetings be called, and resolutions be passed, fixing a rule in regard to this matter, and a committee appointed to see that it is carried out as faithfully as possible; or the same action may be taken at the meetings of farmers' clubs, where such exist. There ought to be a State enactment to prevent the abuses referred to; but this is not to be hoped for.

We have conversed with large numbers of the successful stock-raisers of Kentucky and Middle Tennessee, and have found a general coincidence in the views here expressed. Many of them, indeed, have condemned the unnatural practice of exacting from the horse such excessive services with the utmost severity. Among this intelligent class it is not uncommon for a gentleman to keep a horse of his own to serve his own mares and, perhaps, a few others. Sometimes, a few farmers club together, and raise a joint fund for the

purchase of a first-class horse. This is a very excellent plan, deserving a much wider adoption than at present.

In dismissing this subject, we wish to impress upon the minds of all interested in it the importance of this general rule: that no horse should be compelled to repeat his service more than twenty times during the season, and never oftener than every other day. Every farmer is doing an injury to his stock and to his own pecuniary interests, when he permits any serious departure from this regulation. The adoption of the rule here specified would make it perfectly proper to charge increased rates for the season or by insurance. It would be greatly to the advantage of the farmer to pay even double the rate now asked, and get a colt worth double the common run.

THE HORSE AND HIS QUALITIES.

The qualities of the sire, of more importance than all others, are his capabilities of endurance and kindliness of disposition. The former depend mainly upon soundness of wind, compactness of muscle, and proper form. His limbs should not be too long, but trim and clean, and his joints round and well set. The hips are the most essential points to be looked at in regard to the horse, as in them and in his hind limbs lies his great power. But the shoulders must not be neglected; they should be broad, not high and sharp, but round over the top.

For the average farm horse of this country, about sixteen hands is the most desirable height. Much above or below this standard is objectionable. A horse, with full form and well-developed muscle, it is preferable to have below rather than above sixteen hands high. The color of the hair is an indication of some importance. A deep dark bay is the best color for strength and endurance, and generally the most desirable qualities as regards disposition. The iron-gray is the next, then the black, and, as the shades grow more and more light, they become increasingly objectionable. Whatever the color of the horse, the mane and tail should be darker than the hair of the body. Beware of that horse

with dark hair and light mane and tail. Fine, short hair betokens fine blood, and coarse, long hair the reverse; yet there are some breeds of horses with long hair and totally lacking any signs of fine blood, that undoubtedly possess great powers of endurance.

No stallion should be regularly used for breeding purposes until he is four years old. At the age of three, two or three mares may be put to him for the purpose of testing his qualities as a foal-getter; but not more than this number, since very few horses will pass inspection when so young. If his stock is passable at this age, he will do to keep as a stallion. His colts will improve until six, and then remain good until he is ten, after which, in the majority of cases, he begins to deteriorate as a foal-getter. A horse that has served but twenty mares each season will ordinarily last until he is twenty quite as well as will another, of whom treble this amount of duty has been exacted, until he is ten or twelve. Excessive service in this line will impair the powers of the horse sooner than any other circumstances.

It is the true policy of every large stock-raiser to have a stallion of his own. If this is too expensive, let several join together, and either select one of their best colts or purchase one for this purpose. One or two of their best mares may be put to a choice horse under favorable circumstances, and the colt reared for this especial service. Such combinations would greatly improve the stock in any neighborhood, in the course of a few years, and do away with the impositions now so common.

In our country the stallions are generally very good. The selection is usually made from the best colts, and nearly all of them, when not abused by excessive service, produce very good foals. There is no fault here, but in the ignorant and destructive policy of their owners.

Except in the way of general directions, not much can be said in regard to the selection of a particular horse from which to breed. The owner of an entire horse generally has the pedigree and qualities of the animal published, and, in

THE MORGAN HORSE.

most cases, quite truthfully. Most horses breed best for some especial service. If the colt is designed for farm use, it is advisable to put the mare to a farm horse; if for the carriage or saddle, she should be bred to a stallion of superior adaptation for one or the other purpose. A horse for rapid motion should possess very different parts from the farm

THE BYERLY TURK.

horse. The saddle and carriage horse should be of the same mold—light and free of limb, with a height of not more than fifteen hands and a half. The farm horses may be of larger limb, heavier build, and stand somewhat higher.

THE MARE—HER QUALITIES AND TREATMENT.

Of no less importance is it to understand the qualities and capabilities of the mare than those of the horse. Difficulties exist in her case no less than in his, and practical directions

are needed in both. A proper understanding of the faults and deficiencies of the mare, which vary very much from those of the stallion, is of vital consequence to the breeder.

Every farmer knows that one of the prerequisites of a good crop is a fertile, productive soil. Now, the mare may be compared to the soil in which the seed is cast, and it is nearly as reasonable to expect a poor soil to produce a full, prolific crop, as a poor, worn-out mare to bring a large, plump, and healthy colt.

Two principal characteristics are required to constitute the mare a good breeder. The first is body, form—especially length between the hips and shoulders, to give room for the growth of the fœtus without crowding the intestines, and also breadth, which may be determined by the width of the back and hips. A little, short mare, with a peaked back and hips, and narrow, tucked-up belly, can never make a good breeder.

The second essential is vitality. Many large mares are found to be deficient in this particular. A small mare often possesses more spirit and activity, a greater share of vital energy and endurance, than one that is larger. Some mares are very dull and stupid, and sluggish in all their motions. This may be remedied, to some extent, by securing the opposite qualities in the horse, selecting one that has more than an average degree of life and action. On the other hand, if the dam is full of animation, the sire should be one remarkable for mildness and docility rather than otherwise.

As regards form and size, opposite qualities should be paired, as a general rule. If the mare is small, the horse should be of full size. If the former is of large or medium size, the latter may be somewhat less. But in no case should the mare of any size be bred to a very small horse, unless it is desired to perpetuate the pony breed.

Mention has already been made of the benefit to be derived from permitting the association of the mare with the horse for several days. It is of more advantage, in fact, to the dam than to the sire. The instincts of Nature will decide the proper period for coition, which will be that most favor-

able for developing the germ of the new life. As matters are usually managed, the case is often far otherwise. One time of the mare's meeting the horse, or once in nine days for a few weeks, is not what Nature designed, and the customary hurry is really detrimental to her. The wistful look which she casts behind her as she is led away, indicates plainly enough her pining for a little further companionship.

If well grown, the mare may commence breeding at three years of age; but if she is still immature, it will be much better to wait a year longer. Some persons are accustomed to put the two-year old filly to a horse. This is wholly wrong, for at this age she is not qualified to breed at all satisfactorily. It seriously retards her own growth, and may greatly mar her form and beauty, while the effect upon her spirits is still worse. She will always be dull and heavy.

As a general rule, it is not best to continue breeding from the mare after she is ten or twelve years of age. Some will breed successfully a few years longer, while others at that age have already past their best days. Those that bring a colt every year fail the most rapidly, they which possess but little apparent vitality breaking down early. It requires a nice discrimination to determine exactly when to cease breeding from the mare; but it will be better to stop a year too soon than to continue too long.

The question of feeding the mare while with foal is one of the first importance. Here, emphatically, does the axiom apply that "like produces like." The soil must be rich, proper supplies of nutrition must be afforded the growing crop, and judicious care and cultivation must be bestowed, or a bountiful harvest can not be expected. The mare must receive the feed and attention which her condition demands, or it is unreasonable to look for a fine colt. We make or mar the latter by the treatment extended the mother. Many a fine mare, bred to a horse equally good, has produced but an inferior offspring, owing to bad management during the period of gestation; and, on the other hand, many a common

filly has raised a fine colt when she has been well fed and attended to.

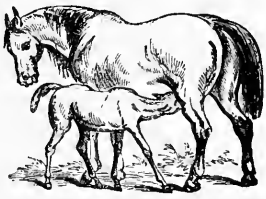
A poor, half-starved mare will bring a puny weakling into the world. The physical condition of the colt depends upon that of the mother. Not only does he derive from her the principle of life, but the conduct of the vital processes in her constitute the agencies which mold his entire bodily organism—bone, sinew, tendon, muscle, and all. The health of the mother can not be affected without corresponding detriment to the fœtus. It is through the medium of her digestion and circulation that the latter is nourished and matured. If she is well fed, the colt receives his share of the benefit, and if she is impoverished, the colt will be the same.

To feed the mare with foal upon strong, heating diet is a great mistake. What she needs is moist, nutritious food, such as can be easily digested and will keep the bowels loose. In winter-time, or at any other season when she is steadily worked, chopped feed, with provender, is the best. In no case let her be gorged with corn; but it will be no harm to give her sparingly of corn-meal, as provender, made moist and thoroughly soaked. If it is in time of pasture, she will need no other feed. In the latter months of gestation the food may be increased. She requires more at this period, having both the foal and herself to support, and the former now draws heavily upon the mother for his sustenance; yet, while she should never be allowed to fall off and become poor, a very full, plethoric condition is decidedly objectionable. In fact, it is still more hazardous to her than the reverse.

Concerning the qualities of the feed, too great care is impossible. At this time, of all others, the food should be pure, nutritious, and wholesome. Moldy hay or fodder, or injured grain, should be scrupulously excluded from her diet. Possibly the mother might resist its injurious effects, but the foal must inevitably suffer, and might be ruined entirely. Thousands of colts are brought into the world in a diseased condition, induced by the unhealthy food upon which the mother has been compelled to sustain the lives of both.

Another consideration of importance is the amount of labor the mare may perform. It is better for her to do light work, at least up to within seven or eight weeks of foaling, at which time she should be relieved of all service, unless it be some occasional mild exercise. She should, also, about this time, be removed from other animals, that she may not be injured by them. At no period should she be assigned any very hard labor, or be subjected to severe strains. As she nears the time of foaling, she should be kept where she can be easily watched, so that if any difficulty arises during parturition assistance may be rendered promptly.

During the time of suckling, the mare should receive the best of attention. Her food should be generous, wholesome, and abundant. It should never escape the mind of her keeper that she now has two lives to support, and the tax upon her which the colt's necessities occasion is very great. Occasionally, a bran-mash may be given—rye-bran, if it can be obtained; and at all times plenty of chopped feed, good sweet hay, and oats will be just the diet for her. But abstain from feeding her any corn. If pasture can be procured, she will do better on this than upon any thing else. As feeding the mare is feeding the colt also, nothing should be allowed her that can injure the latter, as some articles of food or medicine may do without seriously affecting the stronger organism of the mother.



After thirty days, if she is again in season, the mare may once more be put to the horse, if the owner is determined to have her bring a colt every year. But to this there is a grave objection. In all of the animal creation, a state of pregnancy injuriously affects the character of the milk afforded the suckling offspring. Better colts can be raised by breeding the mare only every second year.

The labor of the mother should be quite light, beginning not before a month or six weeks after foaling. Except for

specially urgent reasons, the colt should never be prevented from running with the mother.

THE COLT AND HIS TREATMENT.

If the foal is sound and healthy, he will need no especial attention until the time of weaning, which will generally be at the end of about six months. But upon this point no arbitrary limitation can be established. The condition and developments of the colt must determine this matter. If the youngster is thin and weakly, he should be allowed to remain with the dam for a month or two longer, and in extreme cases even more than this. Fall colts should always be allowed the mother's milk till the grass comes in the spring. Many fall colts are weaned too soon, and they nearly perish during the barrenness and inclemency of winter. This mistaken practice seems to be the real origin of the common belief that the fall colt is not so good as the one foaled in spring. It is impossible that he should be, under such mismanagement; for the rigor of winter is more than the young creature is able to bear when left to shift for himself. Let him be allowed the help of the mother's milk until the young grass of spring affords him a suitable substitute. If this is done, he will often be found in advance of the yearling that has been fed during the winter.

At weaning-time the colt should be entirely removed from the sight and hearing of the mare. By this course she will soon become reconciled to her loss, whereas, if he is allowed to remain near her, she will continue to fret under the separation, and will be troublesome.

Now comes the important matter of feeding and rearing the colt, second not even to that of the care of the dam before his birth. The young animal will be pretty much what we choose to make him by our treatment. Fewer ordinary colts, by far, would be found if all of them received proper attention, which is not generally the case in our country. Too often the young creature is the victim of cruel neglect and hardships—compelled to stand out in the open field, by

some hay-stack or straw-rick; or, perhaps, without any shelter whatever to protect him from the biting frosts, the bleak winds, the driving sleet, and the deep snows of winter; and frequently with nothing to support life but corn-stalk fodder, or the scanty amount of food pulled from the hay-stack. Under such usage he barely survives the winter, and starts with the spring a poor, emaciated, broken-down starveling, destitute of all spirit and vigor. His vital energies have received a shock from which they will never wholly recover.

Such is the history of thousands of colts all over the land. In many sections the farmer seems to know no better than to believe that colts and calves require no housing during the winter, when the fact is that they are the ones most of all among the farmer's stock that need such shelter. The strong, hardy horse could bear these exposures much better; but it is not he that is turned out to the weather—it is the young, tender colt, inured to no hardships, and quite unfitted to brave the storm and cold, that is compelled to undergo this unfeeling treatment. If stable-room is deficient, make a shelter of some kind for some of the other stock, and let the colt have the vacated stall. One winter's severe exposure is equivalent to the loss of a year's growth. The colt becomes unthrifty and in bad plight, and shows want of spirit and activity; whereupon the farmer complains that he has been disappointed in that colt; that the stock is not what he supposed it to be, with more language of the same sort; and all the while the colt is good enough, the stock all that he ever imagined it to be, and the fault lies wholly with himself. He seems to have forgotten that the limit of the endurance belonging to colt-flesh is soon reached, and really ought to wonder that the poor thing has lived at all.

It is all-important that the colt "get no backset" after weaning-time. Nothing will pay the owner better than kind, generous attention to his growing stock. The young animal needs it now; his flesh and skin are tender; his bones and joints are still soft and unformed, and exposure at this period often works irreparable mischief. The joints are af-

fected, growing unnaturally large and stiff, so that he moves heavily, and with lack of suppleness. What he loses at this time no subsequent care can entirely make up, while with the treatment he is likely to receive from such an owner he can never be other than an inferior animal. Many of the diseases that develop in after years to the horse's ruin have their foundations laid by mismanagement during colthood. There are vastly more horses with stiff limbs and spiritless, heavy movement, whose condition is referable to this cause alone, than one farmer in fifty is willing to believe. It will cost less to put up a stable sufficient to accommodate six colts, than the loss, in a single winter, upon one good colt that is left out in the weather to shift for himself.

Along with housing comes another consideration of the highest importance—feeding the colt. The pasture is emphatically the home for him, so that while it lasts there need be no further trouble upon this head. But in winter let every colt have his separate stall in a dry, warm stable, with good bedding and all the attention, in respect to rubbing and currying, that is bestowed upon the full-grown horse. His diet should be a mild and generous one, suited to his young and tender state. Let the owner be chary of giving much dry food. Chopped feed, moistened, is more necessary for the colt than for even the mature horse. A bran-mash should be given him as often as once or twice a week regularly.

This seems to be an appropriate place for considering the question of "inherited diseases," concerning which so much has been said and written. English veterinarians have paraded this subject before the public to an extent that, to our thinking, is absolutely ridiculous. According to them, every disease of the parents will be transmitted to the colt, who will be afflicted with the infirmities of both. Says Youatt, judicious an author as he generally is: "There is scarcely a disease by which either of the parents is affected that the foal does not inherit, or at least show a predisposition to. Even the consequences of ill-usage or hard work will descend

to the progeny. There has been proof upon proof that blindness, roaring, thick wind, broken wind, spavin, curb, ringbone, and founder have been bequeathed to their offspring both by the sire and the dam."

Whatever may be the case in England it is not thus in our country. Rarely, indeed, do American farmers attempt to breed from such stock, although they may, perhaps, do so in exceptional instances, where it is the mare that is diseased—not once in a thousand times, however, from an unsound horse; and even were this end sought, it is our opinion that few American horses, of either sex, would breed when diseased to such an extent as to transmit their maladies to their offspring.

Nor do we believe that hereditary disease is of nearly so frequent occurrence in England as the books would persuade us. The disorders called such are, for the most part, such as the low, damp, dark stables of their great cities, in which they are often built under ground, would naturally give rise to; and here, in all probability, is one great source of mischief in the large majority of cases. Then the mistreatment of the mare while with foal, together with the unkind and irrational neglect of the colt after weaning, is a prolific cause of those ailments and infirmities to which the first years of the horse's life are subject, and many of which cling to him until the day of his death. Few foals make their advent into the world otherwise than in at least a tolerably sound condition, unless abuse of the mare during gestation has begotten some innate weakness or other, when neglect, exposure and abuse will rapidly do the rest in developing disease in the young animal.

Even the hereditary character of certain disorders in the human being is, perhaps, less firmly established than is commonly asserted; but, however this may be, the so-called law has so many exceptions when attempted to be applied to the horse, that one can hardly help pronouncing it inoperative in his case. Some of the finest colts we ever knew

have been raised by feeble mares, although such can scarcely be considered the rule.

Highly as we esteem many of the authorities that upon this point are against us, still we are compelled to dissent from the sweeping assertions that most of them put forth in regard to the dangers of transmitting disease from one generation of the horse to another. Our concern for the future of his race in America is, we confess, by no means an anxious one, so far as this subject bears upon it.

CROSSING.

A judicious and restricted system of crossing may be of great advantage to our future stock of horses; but a promiscuous, unguarded one will prove its ruin. The practice of breeding *in-and-in*, using the term in its most restricted sense, has been proven, by the past history of the horse, to be detrimental to such an extent as to prove absolutely ruinous. What we mean, in this connection, by breeding in-and-in, is to continue breeding together members of the same family—blood relations, in fact. There may be many families of the same race, and still no known blood connection exist between them. Our strictures must not be understood to mean that Andalusian may not be bred with Andalusian, Arabian with Arabian, or the pony with the pony; but they do mean to condemn, most emphatically, the practice of breeding within the limits of near relationship—such as mother and son, brother and sister, and the like. Where such relationships are known to exist, the intelligent breeder will carefully avoid permitting any connection.

Any race of horses may be perpetuated in its purity, and even improved, by bringing together remote families of that race, and then practicing a judicious system of crossing among them. These are the means by which the Arabs of the desert maintain the wonderful superiority of their steeds; and the instincts of Nature have performed a similar service for the wild horse of the plains, which is of Spanish origin, and for the ponies of the Indians. We must enter our protest

against the crossing of races very dissimilar in form, size, and habits. The Indian pony may be bred to the finest horse in the country, even the imported Arabian, and the colt will be but a scrub, having few or none of the good qualities of either sire or dam. All subsequent combinations of the same sort will sink below the standard of even the first cross.

The art of successful crossing consists, mainly, in bringing together distinct families of the same race, but of somewhat contrasted forms and sizes. The mare elevates or depresses the race above or below the standard of the horse according as her qualities are superior to his or the reverse. The nearer the mare is to the horse in all essential qualities, the nearer will be the colt. If she is superior to the horse, she will generally produce offspring of the same relative character, though more or less inferior to herself. On the other hand, if the horse be the superior animal, the foal will be also, but not so good as his sire.

This is the general rule, which only holds good, however, when the horse breeds his own stock and qualities. Sometimes he breeds back to several generations previous, and this may occur when the older stock is either better or worse than himself. Where the mingled qualities of several races exist in the horse, one of them often greatly predominates in the foal. There can be no certainty in breeding from a horse of this character, unless some particular blood is known to predominate in his case to begin with. In regard to the mare, we may judge with more accuracy; her size, form, plight, etc., will indicate pretty clearly the kind of a colt we are going to obtain.

The law of compensation, so much dwelt upon by many writers, we regard as of but doubtful, or, at least, partial, application in respect to the horse. It is from this rule, so-called, that the practice is derived of meeting the deficient parts or qualities of either parent by superior excellence in the same points in the other. For instance, if the mare be faulty as to breadth of chest, the horse, it is said, should be particularly well-developed in that regard; if the horse be

coarse-limbed, the mare should be clean of limb and supple jointed; and so with other points in the structure of either.

No doubt this notion is correct to some extent, but the limits of those conditions within which it may be acted upon with definite certainty as to results are exceedingly circumscribed. No seriously defective mare will bring a fine colt, let the excellence of the horse be what it may. It is only the fine mare, of superior size, mold, and condition, that can be expected to bring a first-class colt. Such mares, and no others, should be selected for the purpose of raising colts; and if any others are permitted to breed at all, they should be put to the jack, in which case they may do pretty well in keeping up the stock-raiser's supply of mule colts.

CASTRATING.

In relation to the age of the colt at which this operation should be performed there is a great diversity of opinion, even among experienced horsemen. The limits range all the way between the age of four months and two years, both which extremes, as well as all intermediate periods, have been advised in different cases. These differences are arranged with reference to certain physical developments of the colt, which are deemed essential to qualify him for the duties to which he is to be assigned at maturity. Thus, some writers tell us that the colt designed for the carriage or heavy draught should not be cut until he is two or three times older than his companion that is destined to the common purposes of the farm.

Our own opinion is that castration should always be performed very early; in fact, that it should very rarely be deferred to even the age of four months, the minimum limit as now usually established. We are satisfied that, in the case of pigs, lambs, and calves, at least, this operation can hardly be attended to too early, and analogy would seem to indicate the propriety of the same course with the colt. With the beginning of the latter's second year, his pubescence is attained. Often before the close of the first year his actions

manifest the effects of the growth of the genital organs, and the longer their removal is deferred the greater becomes the danger.

During the months of suckling, these parts, as well as the arteries that supply them with blood, are quite diminutive, the vessels will bleed but little when severed, and the sensibility to pain will be comparatively small. At this period, then, castration will not cause much suffering; it will be attended with but little loss of blood, and no clamps or searing will be needed. The application of a little fine salt and turpentine will remedy the evil effects of the operation; and any one that is competent to undertake the castration of a lamb or pig can be safely trusted to geld the young colt. At this age, too, the latter can be handled with perfect ease, and without running those risks of injuring him that accompany the act of throwing the larger animal, preparatory to castration.

Those who oppose the practice of cutting so early base their objections chiefly upon the statements that the colts gelded so young do not make as well-developed and fine, spirited horses as if they were allowed to remain entire some time longer. But if the objector is asked to specify to what extent his own experience and observation as a stock-raiser corroborate these views, he is generally at a loss for any satisfactory answer. He will tell you that such is the prevailing opinion among most of his acquaintances; but they derive their belief from the opinions of others still; and so it runs back like a confused tradition, having its origin no one knows where. So far as the question of spirit is concerned, the entire horse shows no great excess of that quality save as he is prompted by his amorous propensities. When brought down to ordinary work, or used under the saddle, an old stallion is one of the most stupid, spiritless creatures in the world.

Another objection sometimes urged against the course we have recommended is the difficulty of selecting from the very young colts those which it would be best to retain for stall-

ions. Many persons seem to think that this is a question which can not be decided until the colts are so well grown that their size and form are fully determined, whereas it is one that ought, in great measure, at least, to have been settled before the foal was born, by such considerations as the blood and qualities of the parents of each.

The teachings of our own observation, though it is somewhat limited, are decidedly in favor of very early castration. We can recall a number of cases in which it formed no drawback to a perfect physical development and the possession of a rare combination of excellence in the mature horse. In these views we are sustained by the opinions of many most judicious and highly-successful breeders, with whom we have discussed the subject. English veterinarians seem more and more inclined to favor the same practice, some of them expressing the opinion quite emphatically that in no case should castration be deferred beyond the weaning-time of the colt, as the mother's milk acts as a great preventive of inflammation and fever.

Much perplexity and some trouble is often encountered by inexperienced operators in castrating young colts, from the difficulty of finding the testicle, which has not yet descended into the scrotum from within the abdomen, where its place is during the fœtal life, and for some time afterward. In some colts they always remain there, but usually drop down into the scrotum between the ages of one and two years. No embarrassment need be caused by not finding the testicle just where it was expected to be. Let the operator find the orifice just in front, through the lining of the belly, and trace back the clue thus obtained to the testicle itself, as he can readily do. This orifice is already sufficiently large to allow of his bringing down the testicle, which is about two inches within the orifice, either with the two fore-fingers or by using an iron spoon, bent forward near the handle and wrapped around with cloth. After the precise location of the testicle has been discovered, this instrument will readily scoop it out.

Castration is not only more difficult but is also more dangerous as the colt grows older, and especially after the testicles, having descended into the scrotum, have attained a considerable size. The weight of the bowels, combined with the struggles of the animal, and his springing about afterward, is often sufficient to produce *hernia*, or rupture, thus ruining him forever, if not putting an end to his life at once. The dangers of hemorrhage and inflammation are also greatly increased.

The latter part of April or the beginning of May, when there is plenty of fresh young grass to be had, is the best time for attending to this matter. Fall colts should remain till the early part of October, or until the hot season is past. If there is any danger of the fly, a little turpentine may be mixed with fine salt and applied to the wound, which will effectually deliver him from those torments, and cause no great amount of suffering. It will also tend to heal the parts rather than otherwise. If cold rains come on while the colt is still sore, both he and the dam should be comfortably stabled.

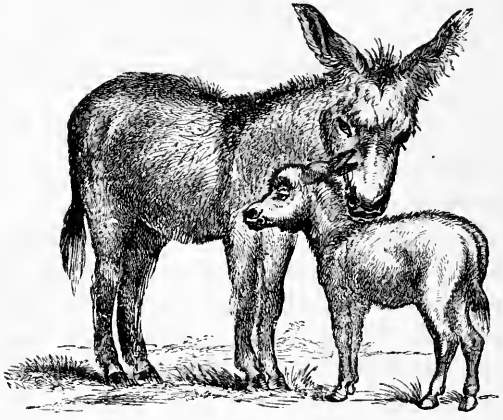
In all parts of the country there are persons who follow this business, and whose services may readily be procured if the farmer desires them. This will be the best and safest course when the operation has been deferred until late.

The operation *by torsion*, as it is called, introduced into England rather more than one-third of a century ago, probably forms the mode of castration preferable to any other, especially if the colt has attained many months' growth. It is thus described by Youatt:

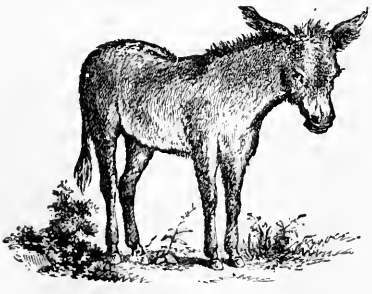
"An incision is made into the scrotum as in the other modes of operation, and the *vas deferens* is exposed and divided. The artery is then seized by a pair of forceps contrived for the purpose, and twisted six or seven times round. It retracts as soon as the hold on it is quitted, the coils are not untwisted, and all bleeding has ceased. The testicle is removed, and there is no sloughing or danger. The most painful part of the operation—the application of the firing-iron or the clams—is avoided, and the wound readily heals."

The practice of *twitching*, resorted to by some as a means of shirking a disagreeable job, is an outrage and barbarity. It consists in tying a small cord around the bag, so as to destroy the circulation, tightening it, if necessary, and letting it remain thus until the scrotum, with all its contents, drops off. Not only are the sufferings occasioned by this disgraceful and slovenly method extremely severe, but inflammation and death often ensue.

THE MULE.



The business of raising mules has become an extensive and important interest in our country. In Kentucky and Tennessee immense numbers are reared every year for the Southern market. They have been found much better suited to the requirements of the cotton plantations than horses. They work freer and with less trouble, are more hardy, stand the climate better, and are not so easily affected by the neglect and cruelty of the negroes and others



who use them. On the score of economy, also, they deserve all the favor that has been awarded them in those sections, and vastly more than they commonly receive at the North. The mule does not eat more than from one-half to three-fifths as much as the horse, which, when feed is high, is an item of importance.

Though not wholly exempt from disease, the mule is incomparably a healthier animal than the horse, particularly on the Southern plantations, where most of the latter race were originally brought from other latitudes. As to his capabilities for service, not only is he the equivalent of horse-power, but he will last more than double the number of years that his more pretentious congener will. The average period of service of the horse is about ten years, beginning at the age of three, and, although some horses last considerably longer than this, there are quite as many that fail before completing their thirteenth year. The average period of service of the mule is nearly, or quite, twenty-five years. He sometimes begins to fail at twenty years old, and in other cases remains as good as ever until nearly thirty. Few of his race are worth much after that age. One mule, then, in his lifetime, will ordinarily do the work of more than two horses, at an expense each year of from thirty-five to fifty per cent. less in keeping.

Another important consideration is, that the mule thrives best on dry feed and grain unground. How far otherwise it is with the horse our reiterations have already acquainted the reader in the preceding chapters. The horse's feed should be all chopped or ground; his diet should be light and moist; and corn is unquestionably injurious to him, especially when he has to bite it from the cob. Just the reverse of all this suits the mule best. Corn, which is his favorite food, never appears to have any ill-effects upon his system, and nothing is better adapted to his needs than dry hay, if it be good and sweet. This is an item of some consequence when the saving of the miller's toll—never less than one-eighth—and the time and labor of going to mill are all reckoned up. It

will make the aggregate difference between the horse's keeping and that of the mule hardly ever less than one-half.

The cost of wintering a mule in 1860 was computed to be ten dollars less than that of a horse. In 1866 this must certainly be increased to not less than fifteen dollars. In the former year there were about half a million of mules in the United States, whose employment, instead of horses, thus formed an aggregate saving to the country of five millions of dollars in the cost of wintering alone. This greatly superior economy attending the use of the mule, taken in connection with his readiness to labor, his comparative freedom from disease, and his double longevity, makes the calculation largely in his favor as a trusty and valuable servant.

There is also more certainty in breeding mules than horses. The mare is more likely to become with foal by a jack than by a horse, and the same proportion of accidents do not occur in her foaling. Every breeder knows how much less trouble it is to raise a mule colt than a horse. Another consideration of some weight is, that almost any scrub of a mare will bring nearly as good a mule colt as will one with the very best blood. The offspring may be small and compact, but he is none the less valuable on that account; and, in fact, some reasons really make him more desirable than many a larger animal—especially his greater hardiness and less expensiveness in keeping, from the fact that he eats so much less.

A mare that has once brought a mule colt, should never afterward breed to the horse, as her progeny in the latter case will be noticeably inferior. By precisely what physiological laws this matter is governed can not be easily explained, but the fact is indisputable. Fine blooded mares, of superior size and form, should always be bred to the horse, and all others that are bred from at all should be reserved for the purposes of mule-raising.

Not only is the mule much better adapted than the horse

to the performance of the ordinary labors of the farm, but he does better in heavily-loaded wagons upon the road, and is especially preferable for the movement of machinery. Here his superior powers of endurance give him such an advantage, that in these services he will often last nearly as many years as the horse will months.

One idea that used to be quite prevalent, and is still entertained by some, in regard to the mule, is very erroneous, and that is that he is never diseased. But that he is much less liable to disease than the horse is undeniably true, and a fact to which we are fully prepared to add our corroborative testimony, from a long experience with both. Yet we have known the mule to be afflicted with a large majority of the ailments to which horse-flesh is heir, and have had occasion to treat him for them. When the ravages of big head were at their highest in Western Tennessee and Northern Mississippi, during the years from 1848 to 1850, inclusive, thousands of mules in that region were numbered among its victims, and many similar cases occurred in other sections of the Southern States. We have repeatedly seen them suffering from spavin, ring-bone, narrow heel, founder, fistula, colic; diseases of the lungs, of the skin, of the glands of the throat, of the urinary organs, etc. Perhaps they are not much less subject than the horse to certain constitutional diseases, such as distemper, farcy, and glanders. But even here one striking advantage remains with the mule—disease yields much more readily to treatment than when it attacks the horse.

A very unjust prejudice against the mule exists in the minds of many, having its origin in the incorrect notion that the mingling of the blood of the horse and ass is prohibited in the Bible, in support of which view they quote the injunction to the Jews, "Thou shalt not let thy cattle gender with a diverse kind." This precept is but a written interpretation of one of Nature's fundamental laws, yet it is by no means clear that these two animals are of types so dissimilar as to come within its limitation. The gendering of

totally diverse kinds, wherever attempted, has either been wholly unproductive or has resulted in some monstrosity for a progeny. Such is not the case with the mule, though himself incapable of breeding, and this circumstance alone is a great argument in favor of his legitimacy in the animal creation. Judged by the test of usefulness and adaptability, the mule may claim a high rank among the domestic animals.

That the Divine interdiction was not construed by the Jews in this restricted sense appears plainly from several references to the mule throughout the historical books of the Old Testament. For instance, when David, in the zenith of his power and glory, as king of Israel, commanded certain of his attendants to "take with you the servants of your Lord, and cause Solomon, my son, to ride upon *mine own mule*, and bring him down to Gihon," it is evident that he intended a compliment and honor to the royal heir. And Solomon, in the height of his almost unexampled prosperity and glory, received "horses and mules" as tribute, among such costly articles as "vessels of silver, vessels of gold, garments, spices," etc. It seems little likely that the inspired record would have such facts to recount had the ancient people of God understood that the very existence of the mule was due to the violation of an express command of the Divine law-giver.

It is none of our business to enter upon a thorough discussion of what was really intended by this prohibition. Our object is simply to exonerate and defend the much-abused and unjustly-despised mule, and to relieve the minds of the scrupulously conscientious of the fear that in breeding that useful servitor of man they are coming in conflict with the revealed will of the Creator. To our mode of thinking there can be no valid objection to breeding together the mare and jack, if it suits the interest and convenience of the farmer to do so.

STOCK FARMS.

Under this head we wish to embody a few general but highly-important directions in regard to the management

of those farms devoted principally, or partially, to the rearing of stock, so far as this subject relates to the horse and mule.

It is a great fault on many farms of this character that there are no suitable buildings, or at least no sufficiency of them, for the shelter of stock, and especially of the young and growing colts. Such negligence is a great mistake, and one for which the farmer has to pay dearly in a pecuniary sense. It is almost as needful that his stock should be afforded proper shelter from the storm and cold as that the hay and grain they eat should be well secured. The subject of stabling was considered in the last chapter at sufficient length for all the purposes necessary in this volume.

But, in addition to dry and commodious stables for winter use, shelter should be provided sufficiently large to accommodate all the young horses and mules during the cold rains and storms of the spring and fall season; and these should be either in the pasture itself or accessible from it. The size of the shelter should be proportioned, of course, to the number of animals to be accommodated. A shelter of twenty feet square will be large enough for twenty colts, if there be a partition run down the middle, as there always should be. On each side of this ten can stand very comfortably. The construction of such a shelter is very simple, and need not be expensive. All that is required, in addition to a roof, set on posts eight feet high, and resting on large flat stones to keep them from the ground, will be an inclosure of the north and west sides with boards. A cheap substitute for the latter, and one that will last for several months, is a compact wall of good wheat or rye straw, straight and strong, bound up in long, continuous sheaves or layers, set perpendicularly, and secured within two or three boards placed horizontally and fastened to the posts. The division through the center should consist of a rack to hold hay or straw, and when the grass begins to fail late in the fall, or before it has grown much in early spring, a supply of these articles of fodder should be kept in it, so that the colts may

be fed here as well as sheltered. Troughs should be arranged under the racks, to put other feed in when the colts may require it.

It will here be proper again to call the attention of the practical stock-raiser to the diseased condition that so often characterizes the colt's mouth, as a consequence of teething. Perhaps the best place to give the young animal the remedies that will correct this state will be right here in these feeding-troughs. The shabby plight of many a colt proceeds from indigestion, caused and kept up by the soreness and inflammation of the mouth and gums. Good wood ashes, with plenty of salt, kept constantly in the feeding-troughs, will have the happiest effect in abating the evils referred to, and in mitigating the sufferings of colthood. Sulphur, also, may be used in the same way with very marked benefit. Not only is it worth a thousand times its cost, as a preventive of disease, but it will effectually destroy and keep away vermin of every description.

On many farms there exists a great lack of shade-trees, not a few pastures being totally destitute of them, and this is another most weighty reason for the erection of such shelters as we have described. It is absolutely essential to the comfort and well-being of stock, especially of the colts, that they have some cool retreat under which to retire from the burning rays of our midsummer and dog-day suns; and where there are no trees to afford a natural shade, an artificial substitute for them becomes a necessary appendage upon every well-regulated stock farm.

Shade-trees are the beauty and blessing of the pasture, and there will be a very perceptible difference in the fall between the appearance of a colt that runs in a well-shaded pasture and that of another which has no shelter from the noon-day heats. The young animal can not be continually exposed to the down-pouring of the sun's fierce rays, through the hottest months of the year, without suffering plainly from debility and depression. One of the first things to be done in a new pasture, if shade is unfortunately lacking in

it, is to take measures at once to supply the deficiency. Trees should be set out in different parts of the field, reference being had to convenience of location, character of the soil, and other circumstances that the intelligent farmer will not be likely to overlook. The preferable tree for the pasture is the black locust. It will grow very thrifty on even a poor, rocky point; it bears a large sweet blossom, which, as well as the leaves, is very healthful for stock; and the grass that comes under it will be of more luxuriant growth, and prove more palatable than the pasturing under any other tree. On some rich flat the sugar-maple may be planted; and beside the creek or branch, if there be one, the willow slip may be set out and will grow with surprising rapidity. The locust also grows rapidly, and all these trees make a fine shade and are valuable for wood, rails, and timber. For making rails and fence-posts, the locust is almost unequaled. Locust rails will last a century.

Shrubbery is a desirable feature in any pasture, and there are special reasons why even the briars may profitably be retained on poor, thin, or stony knobs, and along the gullies and ravines. The blackberry bush will enrich a poor soil almost as fast as any other known appliance, while the roots will effectually prevent any washing away during heavy rains. It is excellent, also, as a preventive of disease in some cases, as well as a remedy. Instinct teaches the horse, and other animals, many facts that concern his health and prosperity, and thus the leaves of several trees and weeds, and even those of the bramble-bush become the medication to which Nature bids them resort. The principal value of the blackberry in the pastures arises from its astringent qualities, which make it of the greatest service in relieving the "scours" that is so common among young colts in the early spring, and which keep many of them thin and poor for nearly the whole season. This trouble generally disappears when patches of briars can be got at, since both horses and cattle eat of the leaves freely. Of course the briars should not be permitted to overspread the whole field, or to occupy

the choice parts, but only such locations as we have specified. When we consider that they bear a most delicious fruit for table use, it seems still more unwise to destroy them altogether.

Small fields are better than large ones, in the division of the pasture lands upon the farm. Frequent changes from one field to another will be beneficial to the stock, and likewise to the pastures. "A change of pasture makes fat calves." The saying is old and trite, but it states a truth, nevertheless, and applies equally to the colt. By this course, too, the field will afford considerably more grazing, taking the season throughout.

If it can be so arranged, colts of different ages should be kept in separate fields; or, rather, the older horses, unless it be some old mother mares, should not be allowed to run with the colts. If any of the latter do not thrive well, but remain in bad plight, let the farmer separate them from the rest and try to learn what the matter is, and then set to work to remedy the evil. When a number of colts are running together, the weaker and smaller ones are sometimes greatly abused by those that are larger and stronger. This should be seen to in all cases, and such arrangements made as will insure the feebler stock a fair chance.

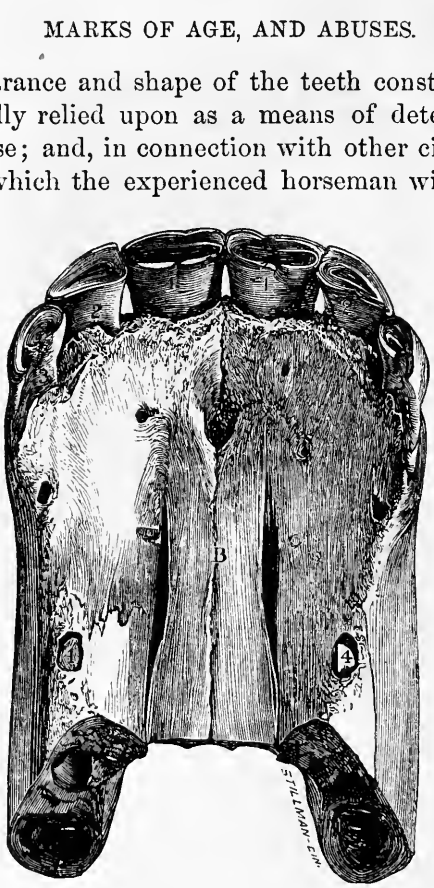
The question of water is a very important one. Dead ponds and mud-holes are not what is needed on a stock farm. They are hardly any better suited to the horse's uses than they are to those of the human being, and many colts are enfeebled and often diseased by having only such water afforded them to drink. Fortunate, indeed, is that farmer who has a spring or a running stream within his pasture. In the absence of such a blessing to his stock a good well is the next resource, and should be immediately sunk and fitted up with a good chain-pump, and a large trough to hold the water. Artificial ponds deserve universal condemnation; they are cess-pools of filth and disease. It is much easier, we know, to let stock run to the mud-hole, and help themselves to such dirty water as they can find there, than it is

to pump from the well, once or twice a day, the supply of drink that they need; but it will not pay to save labor in any such manner as this. Any running water, or the pools in the bed of a rocky-bottomed creek, will do for stock. If it can be avoided, no water should be given the horse, except such as we are willing to use ourselves. Upon this point most farmers are very heedless generally, perhaps, because they do not know to what extent their inattention or indolence may injure the horse.

CHAPTER XIX.

MARKS OF AGE, AND ABUSES.

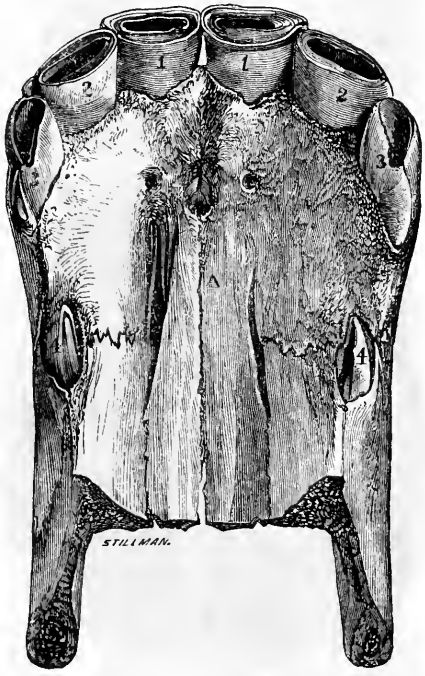
THE appearance and shape of the teeth constitute what is most generally relied upon as a means of determining the age of a horse; and, in connection with other circumstances, concerning which the experienced horseman will always as-



THE MOUTH OF A THREE-YEAR OLD.

B, Anterior maxillary bone.
1 1, Central permanent nippers, nearly full-grown.
2 2, Milk teeth, worn down.
3 3, Corner milk teeth, still showing central mark, or kernel.
4 4, Tushes concealed within the jaw.

certain full particulars, if it be possible to do so, they really form a quite accurate mark of age, until the animal is somewhat past his prime. The anatomy and names of the three kinds of teeth found in the horse's mouth have been given as fully as the practical farmer and breeder will care about knowing, in Chapters II and X. All that now remains to be done

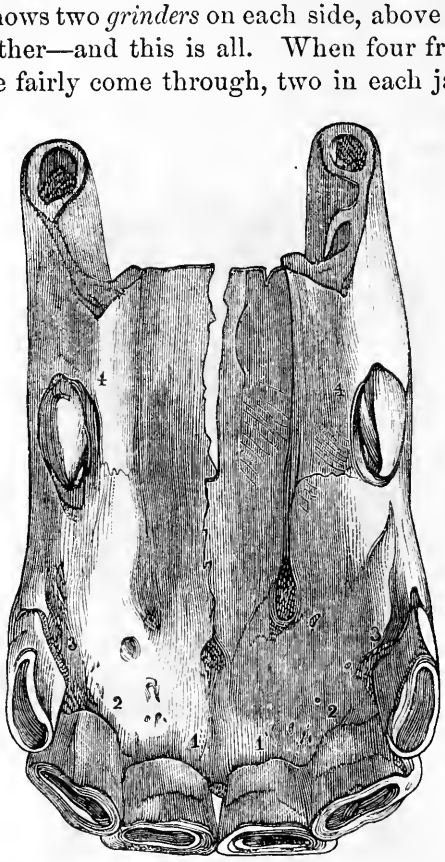


MOUTH OF THE COLT AT FOUR AND A HALF YEARS.

A, Anterior maxillary bone.
1 1, Central nippers, considerably worn down.
2 2, The next pair, fully developed, with their edges slightly worn.
3 3, Corner permanent nippers, in a state of growth, with the edges of the cavity sharp, and the mark very plain.
4 4, The tushes showing themselves through the gums, but not full-grown.

is to point out the peculiarities which generally characterize the teeth at different periods of the horse's life, and by which his age may be determined with considerable exactness.

At birth, or within two or three days afterward, the mouth of the foal shows two *grinders* on each side, above and below—eight altogether—and this is all. When four front teeth, or *nippers*, have fairly come through, two in each jaw, he is ten



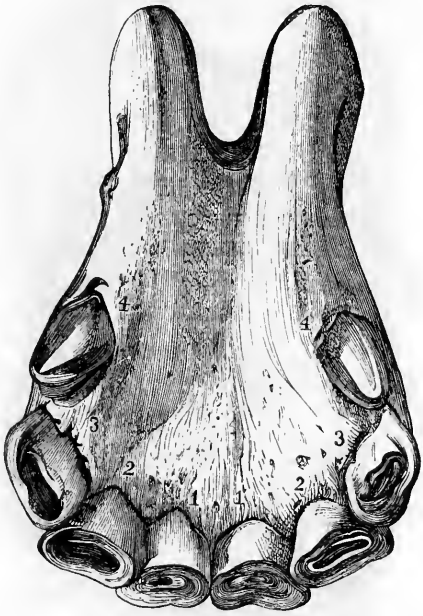
UPPER NIPPERS AND TUSHES AT FIVE YEARS OLD.

1 1, Central nippers, with mark still unobliterated.
2 2, Next nippers, with mark still plainer.
3 3, Corner nippers, with the edges very slightly worn.
4 4, Tushes, well-developed, and still plainly showing the groove on the outside.

or twelve days old; and when the next four appear, one upon each side of the others in both jaws, he is nearing the close of his first month. The protrusion of the corner teeth—that is, the third pair of nippers in each jaw—indicates an

age of about eight months. At one year old, the central and the second pairs of nippers are worn nearly level, and the corner tooth, which is now of the same length as its neighbors, is rapidly becoming so.

The two-year old colt has the mark, or *kernel*—the dark, hard substance in the middle of the crown of the tooth—ground quite out of all the front teeth, or nippers. So far



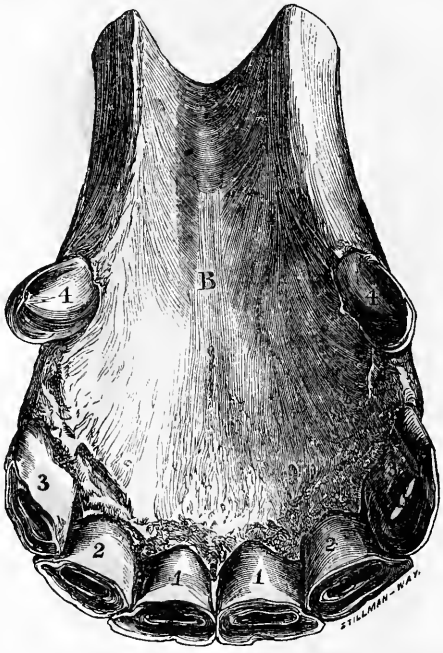
LOWER NIPPERS AND TUSHES OF A FIVE-YEAR OLD HORSE.

1 1, Central nippers, with their marks almost entirely worn out.
2 2, Next nippers, showing marks partially worn.
3 3, Corner nippers, with the marks plainly seen, but the edges giving evidence of wear.
4 4, Tushes, with the groove inside almost obliterated.

the young animal has got along very well with his *milk teeth*, but now he begins to need others, not merely larger, but also of a firmer, more durable composition and setting; and this necessity Nature meets by commencing the replacement of the first set by the *permanent teeth*. This operation begins

with the first grinder—the forward one; but as the grinders are all of them too far back in the mouth to be easily inspected, we must continue to depend mainly upon what we can discover in connection with the nippers.

During the third year the central nippers are being shed—or shifted, as it is often called—and by the time it is com-



LOWER NIPPERS AND TUSHES OF A SIX-YEAR OLD HORSE.

B, The lower jaw.
1 1, The central nippers, with the marks worn out.
2 2, The next nippers, with the marks disappearing.
3 3, The corner nippers, showing the mark plainly enough, but with the edges of the cavity considerably worn.
4 4, The tushes, standing up three-quarters of an inch, with their points only slightly blunted.

pleted, the permanent pair have become nearly full-grown. (See cut of the mouth of a three-year old.) In the fourth year, the same changes occur in the second pair of nippers;

and about the time of entering upon the fifth year, the *tushes*, or bridle teeth, are generally in plain sight.

At the age of five years, the mouth is complete in the number of its teeth, and is now said to be "a full mouth." At six years, the central nippers of the lower jaw are so

UPPER NIPPERS IN THE EIGHT-YEAR OLD HORSE.

A, Anterior maxillary bone.
1 1, Central nippers, worn to a plane surface, or nearly so.
2 2, Next pair, still showing some remnant of the cavity.
3 3, Corner nippers, showing the mark plainly enough.
4 4, Tushes, worn down more than in the lower jaw of the six-year old mouth.

much worn down that the kernel is obliterated, and the tushes have attained their full growth.

At seven years, a hook has been formed on the corner teeth of the upper jaw, the kernel of the second pair of nippers in the lower jaw is no longer visible, and the tushes plainly

show the effects of wear. At eight years, the kernel is worn away from all the nippers of the lower jaw, and is becoming much less conspicuous in the central pair of the upper jaw, or in the wholly stable-fed horse has disappeared altogether.

During the ninth year, what remains of the kernel, if any thing, in the central pair of nippers in the upper jaw, is worn

LOWER NIPPERS, ETC., OF A VERY OLD HORSE.

away, the hook on the corner teeth increases in size, and the tushes lose their points. The tenth year witnesses the disappearance of the kernel from the second pair of nippers in the upper jaw, and the eleventh from the corner teeth also. At twelve years old the crowns of all the front teeth in the lower jaw have become triangular, and the tushes are much worn down.

As the horse continues to grow older, the gums, in consequence of a gradual process of absorption, shrink away from

the teeth, which from this circumstance acquire a long, narrow shape. The engraving on the preceding page is a faithful copy from nature of the lower nippers and left tush in a very old horse. It will be perceived that the right tush has fallen out.

After the horse is eight years old, his age can not be told with any thing more than simply an approximation to accuracy, although an experienced horseman will not very often err during the next four years. After the age of twelve, we know of no reliable guide further than this, that very long, smooth teeth indicate extreme old age. A few horses exhibit only slight changes in the appearance of their teeth after attaining their ninth year. We have met with several that, at the ages of twelve or fifteen, had the marks of only eight or nine, and quite a number whose corner teeth never had any hooks.

The appearance of the teeth will be considerably modified by the kind of food which the horse eats, the soil and climate of the country in which he lives, and the like circumstances. Horses that run a great deal upon pasture, in sandy countries, have their teeth worn smooth unusually early. The sand, lodging upon the grass, is being continually ground between the animal's teeth, and by this means the distinctive marks of age, relied upon by horse dealers and jockeys, are often brought on prematurely, so far as the teeth are concerned. Judged solely by this indication, many a horse of five or six would pass for ten.

Along the Mississippi River, and many of its tributaries, hundreds of horses and colts live nearly the whole year upon the cane growing in the river and creek bottoms, and in their case the nippers generally become broken off in such a manner that no reliable marks of age remain. Like those horses mentioned in the last paragraph, that live mainly by grazing on sandy soils, they seldom have any hooks upon the corner teeth.

In some breeds the marks of the teeth vary materially from those which are found in most horses. The pony, for ex-

ample, seldom has any hooks on the corner teeth, nor do his incisors wear off and change with the usual rapidity. In his case, too, the shrinking away of the gums, by age, is so much less as oftentimes to be hardly perceptible. As his life is much beyond the average of horse-flesh, so his teeth last longer in proportion. To some extent, these remarks will apply also to horses of different mold and frame. Tall, bony animals generally have much older-looking teeth than those of small size and compact build. So have those horses that are kept constantly in stable, than their fellows which run most of the time on pasture.

Artificial marks are sometimes made in the lower nippers, by a rascally class of jockeys, in order to deceive the purchaser in regard to the animal's age. This swindling operation is of English origin, and is thus described by Youatt:

"It is called *bishoping*, from the name of the scoundrel who invented it. The horse of eight or nine years old is thrown, and with an engraver's tool a hole is dug in the now almost plain surface of the corner teeth, and in shape and depth resembling the mark in a seven-years-old horse. The hole is then burned with a heated iron, and a permanent black stain is left. The next pair of nippers are sometimes lightly touched. An ignorant man would be very easily imposed on by this trick; but the irregular appearance of the cavity—the diffusion of the black stain around the tushes, the sharpened edges and concave inner surface of which can never be given again—the marks on the upper nippers, together with the general conformation of the horse, can never deceive the careful examiner."

In relation to the means of determining the age of a horse, after passing into his ninth year, the same author has the following remarks:

"The tushes are exposed to but little wear and tear. The friction against them must be slight, proceeding only from the passage of the food over them, and from the motion of the tongue, or from the bit; and their alteration of form, although generally as we have described it, is frequently un-

certain. The tush will sometimes be blunt at eight; at other times it will remain pointed at eighteen. The upper tush, although the latest in appearing, is soonest worn away.

"Are there any circumstances to guide our judgment after this? There are those which will prepare us to guess at the age of the horse, or to approach within a few years of it, until he becomes very old; but there are none which will enable us accurately to determine the question, and the indications of age must now be taken from the shape of the upper surface of the nippers. At eight, they are all oval, the length of the oval running across from tooth to tooth; but as the horse gets older, the teeth diminish in size, and this commencing in their width, and not in their thickness. They become a little apart from each other, and their surfaces are rounded. At nine, the center nippers are evidently so; at ten, the others begin to have the oval shortened. At eleven, the second pair of nippers are quite rounded; and at thirteen, the corner ones have that appearance. At fourteen, the faces of the central nippers become somewhat triangular. At seventeen, they are all so. At nineteen, the angles begin to wear off, and the central teeth are again oval, but in a reversed direction, viz., from outward, inward; and at twenty-one they all wear this form. This is the opinion of some Continental veterinary surgeons, and Mr. Percivall first presented them to us in an English dress.

"It would be folly to expect perfect accuracy at this advanced age of the horse, when we are bound to confess that the rules which we have laid down for determining this matter at an earlier period, although they are recognized by horsemen generally, and referred to in courts of justice, will not guide us in any case. Stabled horses have the mark sooner worn out than those that are at grass; and the cribbiter may deceive the best judge by one or two years. The age of the horse, likewise, being formerly calculated from the first of May, it was exceedingly difficult, or almost impossible, to determine whether the animal was a late foal of one year, or an early one of the next. At nine or ten, the

bars of the mouth becomes less prominent, and their regular diminution will designate increasing age. At eleven or twelve, the lower nippers change their original upright direction, and project forward or horizontally, and become of a yellow color. They are yellow, because the teeth must grow, in order to answer their wear and tear; but the enamel which covered their surface when they were first produced, can not be repaired; and that which wears this yellow color in old age is the part which in youth was in the socket, and, therefore, destitute of enamel."

THE LIPS.

The lips do not afford a precise index of any particular age; but as the horse advances beyond eight or nine years, the upper lip begins to contract or shorten, while the under one commences to lengthen and drop down. The latter often pods out much in the form of half a cocoanut-shell, and increasingly so each year. At fifteen, the lips have generally become much wrinkled and shriveled, and as the horse advances in age this indication becomes more and more marked.

THE HAIR.

There are several appearances of the hair that betoken age. Perhaps the most conspicuous of them consists in the hair over the eyes, and upon the forehead, turning gray. This color generally begins to show when the horse is between ten and twelve years old, and, continuing to grow lighter, as well as to encroach gradually upon the adjacent surfaces, at fifteen it has become a decided mark of age. After the animal has passed his twelfth year, and between that and the sixteenth, a gray horse becomes speckled with innumerable little black spots, giving rise to the peculiar appearance commonly designated as flea-bitten. This singularity is very seldom seen in a horse under twelve years of age, frequently not until after he is fifteen. These dark shades increase as long as he lives.

THE CHIN.

When the horse is about ten years old, the chin or lower jaw-bone begins to be pointed, its lower edge becoming quite sharp and angular. Like the other signs of old age, this change of form increases from year to year. At the same time, also, the skin over the jaw-bone becomes more loose; the flesh shrinks away, until, instead of the fullness and roundness which was found at the age of five and six, there now seems a hollow or depression, and the outer edges or lower angles of the jaw-bone appears to bend out more and more.

THE EYES.

The eyes give indications of old age, in their loss of brilliancy, the flattening of the ball, from the partial absorption of some of the humors, and in the deepening of the hollow over them.

Wrinkles commence coming on the under lid of the eye at a very early age. By many these are considered a more correct criterion of age than even the teeth, and nearly as infallible as the wrinkles upon the horn of a cow. It is asserted by them that these wrinkles make their first appearance at the age of three years, and that all one needs to do, to ascertain how many years old any horse is, is to count these wrinkles and then add three to their aggregate number. Of the correctness of this rule we have serious doubts; yet it is certainly true that numerous wrinkles are a mark of old age.

THE ABUSES OF THE HORSE.

A great many persons use the horse as if they really believed him to be made of iron. It is perfectly astonishing what a lack of mercy, and how much brutality, there is in the world—how utterly devoid some persons seem to be of the commonest instincts of humanity in their treatment of the brute creation—how little regard is paid by thousands to those lessons of the Divine Word that inculcate the beautiful virtue of mercy. The injury which the horse sustains

by maltreatment depreciates his value, in many cases, fully one-third in the present generation, and is the cause of untold evils in the next. Here lies one great obstruction in the way of the improvement of the American horse; while, if we may judge by the accounts of foreign veterinarians, the case is still worse in Europe.

In many farming communities, perhaps nearly all of them, it is seldom that either the mare with foal or the young colt receives such treatment as is essential to perfect health, or such as is conducive to the best interests of the owner. The aggregate amount of debility, suffering, and disease, occasioned by the ill-usage of horse-flesh, in all its hideous forms, is greater than can adequately find expression in words. Perhaps seven-tenths of all the ailments which befall the horse, in civilized communities, is either directly or indirectly the legitimate fruits of the negligence and brutality of man. Many a scrub of a colt would have been foaled plump, healthy, and admirably developed, if the mother had been properly cared for during the months preceding his birth. How many fine colts there are, too, whose future is ruined, or whose prospects are, at least, greatly marred, by mistreatment of themselves or the dams, or of both; and how many good horses has every observant farmer seen thrown into a bad condition, from which they very slowly or never recovered, by the same agencies.

Did the evil extend no further than the animal which becomes the victim of these abuses, we might forbear some of our words of reprobation; but such is not the case, and we must often see it carried, not merely into the future of the original sufferer, but into that of his or her progeny. If the mother is sadly abused during gestation, the foal will come into the world feeble and, perhaps, ill-grown, and can hardly be brought up by any subsequent treatment to the fair standard of his race. The race, instead of having been improved, is thus actually thrown back, and years or generations will be required, under the most favorable circumstances, to repair the mischief done.

We invite the reader's attention to a number of the most common abuses of the horse, and shall freely express our views concerning them, together with our reasons for entertaining them.

OVER-WORKING.

It is strange how little attention is paid by the majority of farmers and teamsters to the equal distribution of labor among their working stock. Nearly as often as otherwise, we find horses unequally paired to do the same amount of work. For instance, a small horse with a large one, or one that is thin and feeble with another that is in good condition and of unimpaired strength.

Then, too, not half the time is there any reasonable account taken of the weight of the load and the character of the road to be gone over. Is the load made suitable to the animal's physical strength, or must he draw as much as elsewhere over a bad or hilly road, a quagmire, or a plowed field, and nearly tug his life out in pulling beyond his strength? The philosophy of light loads and quick trips seems to have been almost forgotten. Many horses have been ruined by severe strainings, either manifesting great lameness or other injury at once, or gradually failing afterward, until they became nearly worthless.

So of overwork in the plow. Hundreds of times have we seen one small horse before a large plow in heavy land, where, to do the work well, was enough for two horses to accomplish. Such exhibitions are very common at the South, as nearly all the land in that section is broken up with one horse.

Young horses are often put to work too early, before the bones are properly hardened and the joints sufficiently strong. In this immature condition, the young animal is not able to bear constant and severe exertion, and if it is exacted of him, the owner must expect that the least serious injury which the horse can sustain will be limbs and joints enlarged

and stiff throughout his whole life. Moderate exercise should be begun quite early, but full service of no kind should be required until the fourth year.

But the greatest abuse in this way is the overworking of mares with foal, as mentioned in the preceding section. Injuring two lives at once, it is a shameful outrage.

Horses that have been idle for some time, either in the stable or pasture, should not be returned to hard labor all at once, but with judicious caution. Upon this point, however, we have dwelt so explicitly in the section on Exercise, in Chapter XVII, that we need do nothing more here than refer the reader to those pages.

WHIPPING AND BEATING.

One would think that the horse had hardships enough, in his daily drudgery, without being made the innocent victim of the crabbedness and ill-nature of those who happen to be in charge of him. Nevertheless, it is amazing how much thoughtless, and often purposed, wickedness there is exhibited in his maltreatment. Some men have a practice, whenever their affairs do not go just to suit them, of getting up a row with their teams, and venting their spleen upon their poor, unresisting brutes. Many appear to find one of their dearest delights in the torture of dumb animals, and can have nothing to do with the horse without expending upon him some of the malice and cruelty of which their ugly natures are full, in the form of kicks, blows, and other brutalities.

Even many a man of better disposition knows no other possible means of reducing a fractious horse to submission, or of quieting a restive one, than the unstinted application of the whip; and when such monsters as those referred to above imagine they have found some pretext for their outrages, there is hardly any telling to what length they may carry their abuses. We have seen such lashings and beatings inflicted upon the horse as would make the blood run chill in the veins of any person not utterly lost to the feelings of humanity.

About the time we began writing this volume, we saw a case of this character. A young mare had been hitched to the plow, a labor to which she had never been accustomed, by the side of a very slow old horse, while she was of unusually rapid motion. She would start quite freely and quickly, pull the large two-horse plow through the unbroken soil, until her strength gave out, and then, forced to stop from mere exhaustion, would refuse, for some time, to go forward. At this one of the men would take her out of the plow, and, with a great club six or seven feet in length, would beat the poor creature with all his might. Not content with giving her at least a hundred blows in this way, he kicked her fifty times or more with his heavy boots. The mare was in that peculiar condition called "in season," and was probably more than ordinarily fractious, as all mares are apt to be at such times; but these brutal wretches did not know her state, neither did they care. She was doing the best she could, the trouble being simply that she was in the wrong place and at the wrong time; for it would have been wise to exempt her from labor at that time, or, at least, to have put her beside some horse having the same life and activity as herself. That dreadful beating nearly ruined her for the whole season, if not forever. For some months now she has been on a visible decline.

Such scenes as that here described are by no means uncommon; they happen every year by thousands. From abuses like these few horses ever entirely recover. We remember the case of a fine young sorrel mare in Tennessee, that was unmercifully whipped because she failed to pull a very heavy load up a very steep hill. The great welts made by the whip stood up all over her body as large as a man's finger. She was made very sick, and gradually declined, until she became almost worthless. Just before this time she had been sold for one hundred and fifty dollars; but six months afterward she would not bring fifty.

Many a horse has been killed by a sudden blow upon some vital part. In our memory there now rises an occurrence

we witnessed some years ago—a fine, large horse struck violently upon the neck, just back of the ear, and falling instantly dead. His offense was refusing to work in a cart. The spine was undoubtedly broken—a sad result which may be easily brought about by a blow upon the first joint of the neck.

In chastising a mare with foal, hundreds of men have so little sense or consideration as to kick her about the body. If the foal is not killed outright by this barbarous proceeding, it is likely to receive more or less injury, which will be permanent.

It would probably surprise every one, if it could be known how many horses are ruined every year in the United States by overworking and cruel punishments. The annual loss to the country in this way would be counted by many hundreds of thousands of dollars.

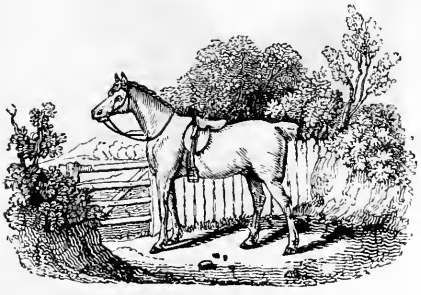
CUTTING AND SLITTING THE EARS.

This senseless and cruel practice is happily very much on the wane. The time once was when nearly every small horse or pony could be seen with his ears cropped, or showing great slits in them. Now, however, one sees such an animal but seldom.

The avowed object of this heartless custom was nothing less absurd than the improvement of the horse's looks. What a perverter of tastes capricious fashion can become! Some farmers have a most outlandish fancy for cropping the ears of all the domestic animals on their estates. The ears of the dog must come off or be cropped close, and so must those of poor old brindle, or the patient yoke of working oxen; while the pigs are predestined to the same mutilation from the moment of birth, so that they have nothing to keep the dirt and mud from their heads when they seek to indulge in the swinish luxury of a wallow in the puddle, or of sunning themselves on a dirty bank.

All this is ridiculous, no less than inhuman. Nature has given these organs to the lower animals to protect the internal parts of the ear, and to keep out dust and flies; but, what is even of more consequence than this, the external ear performs a most important function in catching the undulations of sound, which produce the sense of hearing. To deprive any of these dumb servants of the ears, or to mutilate those members, is to impair the hearing; to leave the *tympanum*—that is, the sensitive membrane within the ear which is commonly called its drum—more or less exposed to cold, wet, dust, flies, etc., and to occasion suffering that is wholly unnecessary.

In the case of the horse, the practice is especially repugnant to all notions of correct taste, to say nothing of its cruelty. The ears constitute one of his chief ornaments. Their various positions and changing motions indicate his temper and feelings most perfectly. When pitched forward, they betray surprise or alarm; when drawn partly back, dislike or timidity; when thrown entirely back, so that they lie on the neck, danger and intention to do mischief; when raised and moving loosely back and forth, they indicate gentleness and docility; and when they droop away from the head, the horse is sleepy or very ill. What true lover of the horse has failed to recognize and admire this beautiful play of the ears? How

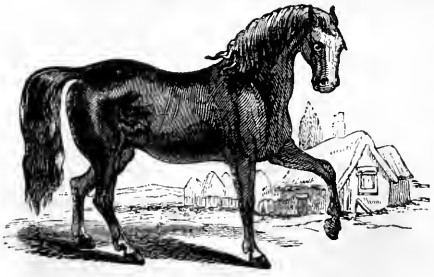


foolish and wanton, therefore, to injure or destroy them, either in the manner here reprobated or as mentioned in the section on Deafness, etc., in Chapter VIII.

NICKING AND DOCKING.

Fashion is, indeed, a tyrant with no mercy, no heart; and this is equally true whether the victim of its whims happens to be a human being or one of the dumb brutes. A certain class of exquisites still linger in our country that have such an excessive refinement of tastes, that every thing they use must differ, in some way or other, from the same thing in the possession of the vulgar herd of humanity. To their notions, the Creator has made nothing just right—nothing to suit their choice, at any rate. Their morbid fancy can suggest improvements upon the most perfect specimens of Nature's handiwork; and thus they are continually torturing the poor animals which are so unfortunate as to fall into their hands.

The Almighty has not seen fit to provide a race of pigs and dogs without ears, nor of horses with short tails, for the especial gratification of this superior order of beings. Nothing daunted, however, they set to work to supply the deficiency, and here the detestable practice of nicking and docking have their origin, the poor horse becoming the subject of shocking cruelties. Not only is he deprived of part of his tail—a member of the highest usefulness and great beauty—but the remainder is so cut, at different places, that the muscles by which it is erected and depressed are permanently destroyed. He must, also, stand with his tail drawn upward by a cord tied to the hair, and then passed over a pulley at the opposite end, where a weight is attached, which stretches the sore and inflamed member as much as



the bones will bear without breaking, or, perhaps, not less than even that. In this condition of extreme suffering he must remain for two or three weeks, without any change.

Thanks to a better state of public sentiment, these outrages have greatly fallen into disuse. Not only have sensible men and men of feeling been disgusted with these barbarities, but they are now rarely demanded by even our city exquisites. Neither nicking nor docking is now practiced upon country horses, and we hope the time is not far distant when both will be remembered only as the dim recollection of a past barbarism. The ears, forelock, mane, tail, and hair are all among the natural adornments of the horse, and none of them can the caprice of man successfully attempt to improve upon.

RACING.

Many of our readers will probably be surprised to see this subject introduced under the head of abuses of the horse, when not a few other authors have placed it almost at the head of their list of essentials in a complete veterinary treatise. Our classification, however, is not the result of any straining after originality, or of any mere freak of the fancy, but originates in the deliberate conviction that racing is one of the greatest and most injurious of the abuses that falls to the lot of horse-flesh in this our day and generation.

The great plea for the sports of the turf is nothing less than a specious fallacy. It is that they tend to improve the breed of horses throughout the land by making known superior merit, and stimulating breeders and horsemen to greater efforts in their various departments. With this statement, it is designed to couple the inference—rather implied than expressed, however—that the same ends can not be attained by any other means, or, at least, not to an equal extent; and by such sophistry is it sought to cover up and palliate those enormous evils—at whose head stands the most corrupting vice of gambling—which are the invariable concomitants of racing.

The argument is but an assumption, and can not be sustained by any demonstrable facts. We hold that racing is not the best means of improving our stock of horses, nor the most extensive, and that, as to the general character of its operations, they deserve the condemnation of every thoughtful and pure-minded individual.

But sportsmen, says the advocate of racing, have imported some splendid stock. Granted, if you choose to have it so; but where one superior animal has been brought into this country by that class, ten are imported by men who have no identification with the turf, and most of them men who ignore and despise it altogether. In fact, this latter class have either imported or bred two-thirds of the horses kept expressly for racing purposes. Sportsmen have a wonderfully keen scent for discovering any animal of unusual fleetness; and wherever they find one, no matter where or how originating, they are sure to buy him up and train him for the race-track; and the "Turf Register" has many famous names upon its pages, as bred by this or that breeder, while that gentlemen has not felt at all complimented by having his name paraded before the public in any such connection.

Like all gamblers, sportsmen generally have plenty of money and leisure, and are extremely fond of pleasure. They are great excursionists, and travel extensively. Many of them are employed by wealthy men, of the same fraternity, to visit the farms of the best breeders in the country and inspect their stock of horses; and if any young animal is lighted upon that gives extraordinary promise of success upon the turf, he is purchased at once, and his training begun.

We have met too many of this class of gentry, during the last twenty years, not to be fully apprized of their character and practices. It is but a miserable subterfuge, put forth to cover the iniquities of the race-track, that the chief object of the sport is to improve the breed of horses in the country. Not one in a hundred of these men ever had such an emotion or purpose in their lives; neither are they capable of so doing. What care they for the interests of the community,

or for elevating the average standard of our stock, if they can get a good horse to run and bet upon? The race becomes, in their hands, only an extraordinarily exciting species of gambling, where the horse is used instead of the game-cock, the cards, the roulette-ball, or the dice. Money is the object, betting is the mania, and gambling the great attraction. This is the center, the soul, the all-in-all of the affair; and if this stimulus were removed from it, the dear people and their fine breeds of horses might go to—destruction, so far as these philanthropic gentlemen are concerned.

The very character of the men engaged in the pursuits of racing—their lives and their habits—condemn any such assumption on behalf of the turf. Who is it that attends such places? Who is it that keeps up the races? The way in which the thing is managed, as we have seen it scores of times, is about as follows: Some man, of horse-racing respectability and notoriety, sends a challenge to some other equally noted man of the same kind of respectability, and who also keeps a race-horse, and backs his challenge by the exceedingly disinterested offer of contributing his share toward a purse of a few hundreds or thousands of dollars, to be given the owner of the winner. These fine gentlemen, be it known, are very enterprising, genteel, and benevolent—gamblers by profession, now devoting themselves to the laudable object of improving the breeds of horses in the country. What a praiseworthy exhibition of public spirit and generosity! But the winner is to have the purse of money, and both may, perhaps, make a snug sum by betting. Ah! here we have the incitement—the full measure—of their benevolence. The purse lays off the race-course and organizes all its appliances—nothing else in the world.

These gentlemen, about to engage in their worthy mission of giving an impetus to the improvement of the stock of horse-flesh, call together an immense number of their *confreres* to enjoy with them the edifying opportunities of the race. The sport is, accordingly, witnessed by an immense crowd of excited spectators. Some burly old judge, who has,

for an hour or two, torn himself away from his whist and champagne, presides on this important occasion. It is his yearly turn-out from his pipe and his gout. It is vacation-time, also, in the gambling dens of the adjoining cities, and every blackguard that is accustomed to frequent them is sure to be found at the races. There betting goes on briskly, of course, from the clean-shaven gambler that can bluster out his offer of hundreds to tens downward in the scale of human respectability, to the boys and negroes, whose sole resources consist in coats, hats, dogs, and jack-knives.

But the professional gamblers comprise but a small proportion of the vast concourse there assembled. Every sink of iniquity of the region round about has a full delegation at the races. Every house of ill-fame, every rum-hole, every hot-bed of vice and crime is here represented. Gamblers, prostitutes, pimps, pickpockets, confidence-men, and swindlers of all sorts, thieves, robbers, burglars, and the like, are all here. And for what? Many of them to ply their dishonest callings, or to advertise their degrading vocations; while the least corrupt spectator has no other motive than to see two or more dumb animals forced at the top of their speed—no matter at what cost of suffering and injury—for one, two, or three miles, as the case may be, and to learn how one grand scoundrel fleeces another grand scoundrel out of the money that the latter, in turn, had swindled some other grand scoundrel out of not quite so sharp as he.

The excitement goes on, and many a successful better wins only to swell the gains of the pickpocket. But another excitement follows, or, perhaps, attends. A festive board is spread, at which King Alcohol presides, and his votaries are many. Here the jolly crowd jest, and laugh, and tipple, the bottles pop, the wine flows, and the foaming cups run over. Here they forget "all their troubles, while money flies, and whiskey bubbles," until at last some chivalric reveller begins a row, ending, perchance, in murder, and so the curtain drops. The great convocation, assembled from the purlieus and the gaudier haunts of vice in the neighboring cities in the inter-

ests of equine improvement closes its session, and pandemonium breaks up, to herald, through the newspapers, far and wide, the wonderful achievements of the race-course. Was it not of such a class, and of such ungodly practices, that the prophet denounced in this fearful language: "The harp and the viol and the tabret are in their feasts, but they regard not the work of the Lord, neither the operations of his hands. Therefore, hell hath enlarged herself and opened her mouth without measure; and their glory, and their multitude, and their pomp, and he that rejoiceth therein, shall descend into it."

Perhaps this picture is characterized by a more vivid coloring than is just in all cases; and yet we must express our unqualified condemnation of the whole system of horse-racing as evil, and only evil, and that continually. It is a gambling institution from first to last. We believe that the great plea put forth in its defense is essentially false, and that if more efficient measures were not employed to accomplish the same ends, there would be but very few fine horses in the country to-day.

Race-horses are not the stock the farmer needs. He has no interest in the turf whatever. There are better bloods in the country than those commonly represented on the race-track. How is it with the other domestic animals? They have improved vastly more than the horse, and that without any such extraordinary incitements as the turf is claimed to afford the horse-breeder. Intelligent, enterprising gentlemen have been found, in considerable numbers, to import fine breeds of cattle, sheep, and hogs, and to-day these animals unquestionably stand in advance of the American horse in all the essentials of fine forms and desirable qualities. Indeed, it may well be questioned whether our horses are not slowly but surely deteriorating from year to year; and, while it would be too much to charge the whole mischief upon the abuses of the race-course, there can be no shifting of much of the responsibility from those causes.

No horse, put to the top of his speed for two or three miles,

can ever be relied upon as a good foal-getter afterward. The great strain in racing is upon the loins—the *sacral vertebræ*—which is the weakest part of the back, covering the genital organs. These are impaired to some extent, perhaps, at every race the horse is forced to run, and his colts show plainly the effects of the seminal disturbances of the sire. As a rule, the most objectionable of all the horses within our knowledge as a breeder is the champion stallion of the race-track. He may come of ever so fine blood, yet his progeny will seldom be equal to himself, and, in nine cases out of ten, will fall considerably below his standard. The number of weak, flabby, loose-jointed colts gotten from such sires will astonish any one who chooses to investigate the matter for himself.

The correction of these evils would be retarded, but need by no means be prevented, by one difficulty, and that is the assumption and parade of the turfmen themselves. The whole subject pertaining to the relative value, etc., of different breeds, has been given up into their hands to an extent that is most unreasonable and hurtful. Unworthy and incompetent hands they are, in truth, not at all meeting the requirements of the case. Had not this class stood in the way, other and better men would have come forward, with different motives, and vastly more would have been accomplished in elevating the average standard of the American horse than has yet been done.

Much, however, has already been effected, and is still being accomplished, in a legitimate and honorable way, to encourage the breeding of fine horses, by liberal premiums at the various fairs—institutions which deserve the countenance of every intelligent agriculturist, and are almost invariably well attended, as they should be. Racing is less reputable than it once was, and we are glad to note such changes in the direction of public sentiment that one may reasonably indulge the hope that racing, if not entirely abandoned, will soon be left solely to the patronage of such classes as are entitled to no regard at the hands of respectable society.

The practice originally came to us from England, and remains as the relic of an early and corrupt age in the mother country. Even there it is losing much of its former interest and prestige. No English author now speaks of it except as belonging to sportsmen alone; and, although all appear to be somewhat fastidious not to offend that peculiar species of gentry, they do bear outspoken testimony to the degeneracy of the horse throughout the United Kingdom, and indirectly hint at racing as one of the prominent causes of this sorrowful phenomenon. Their views find expression in such language as this:

"There can not be a severer satire on the English nation than this, from *the absurd practice of running our race-horses at two or three years*, and working others in various ways long before their limbs are knit, or their strength is developed, and cruelly exacting from them services far beyond their powers, their age does not average a sixth part of that of the last named horse,"—(which was sixty-two years.)

In our country nearly all race-horses are run too young. None of them ever possess qualities that can save them from being injured, for breeding purposes, by such violent overexertion. That the case is the same in England, we infer from such statements as the following, by the author of the "Animal Kingdom," who seems to hesitate, however, about tracing out the causes of the declension of which he speaks: "It may be safely asserted that more horses die consumed in England, in every ten years, than in any other country in the world in ten times that period, except those that perish in war." Now, the English horse is not worse abused than his fellows upon the continent—perhaps not so badly, indeed—in respect to care and keeping; and there seems to be no good reason why such a state of things should exist in Great Britain, unless it is the great and long-time prevalence of racing and hunting there. And that is the country to which we might naturally turn to find the practical demonstration of the benefits of horse-racing, if such a thing were not a mere fiction!

Another well-known English veterinarian says, in reference to the deterioration of the horse in his own country: "Any one, during the last twenty or twenty-five years, must be struck with the sad falling off there is every-where to be remarked in the quality of one-half and three-parts-bred horses exhibited for sale." Yet this class of animals embrace the first edition from the racer's stock that pass into the hands of the farmer. This is certainly improvement backwards.

"If horse-breeders, possessed of good judgment, would pay the same attention to breed and shape that Mr. Bakewell did with his sheep, they would probably attain their wishes in an equal degree." Is not this the work that racers claim to be doing as belonging to their especial department? and then, in spite of all the stimulus of equestrian exercise, to be outdone by a sheep-man!

"Our running-horses," says Youatt, "still maintain their speed, although their endurance, generally speaking, is greatly diminished." Can not the races keep up their own running-stock? If they can, what mean such expressions as the above? Is it not clear that the whole system of racing, so far as the pretences that it improves stock are concerned, is a miserable failure and a gross imposition on the public—such a sham, in fact, as no man of right feeling and principle would willingly be identified with?

One more reference, and we dismiss the subject. Youatt lays it down as an axiom in breeding "that like will produce like," adding that "the progeny will inherit the general or mingled qualities of the parent." The reader is already aware of our qualified dissent from so sweeping a statement; but, applying it as we fairly may, in the present argument, what conclusion are we forced to arrive at when we find the same author making such positive assertions as those? "Our running-horses are considerably diminished;" and, "Our hunters and hackneys are not what they used to be;" and, "Our draught and carriage horses are, perhaps, improved in value." The racers and their offspring degen-

erating—"falling off"—"not what they used to be," while horses bred from other sources—those that the racer discards and leaves entirely to the farmer—are "improved in value."

Here we have an epitome of the history of racing upon both sides of the Atlantic—the whole thing in a nutshell. The race-horses are failing; the farmers' horses are improving.

We sincerely believe that the farmers of our country are the only men possessing the intelligence, the enterprise, the moral character, and the standing necessary to successfully conduct the great work of reform and progress in respect to the horse. It behooves them, as men of this character, to frown down the system of racing as an unqualified abuse of the horse and a potent agency of iniquity and vice.

CHAPTER XX.

GENTLING, BREAKING, AND TRAINING.

GENTLING.

The time to begin the work of gentling is seldom improved by stock-raisers. They have so much else to do that they can not devote the requisite time and attention to this matter; and, in fact, not a few of them neglect this important department of their business entirely, committing it altogether to other hands. In many cases, professional stock-raisers do not so much as superintend the feeding and salting of any of their own stock, much less gentling and breaking their colts. Such men must be but poorly qualified for the important vocation which they do indeed follow—afar off—and many serious evils result from their negligence.

In relation to the subject-matter of this entire chapter, there is a deplorable ignorance and lack of interest among the masses of our farmers. It is quite as much as thousands of them care about, if they can provide some sort of food for their colts, and salt once a week. No further pains are bestowed upon the young animal until he is old enough to be put to work; and then, instead of being gentled and trained for the duties he is to perform, he is very probably disposed of at a sacrifice of twenty or thirty dollars, or even more, in consequence of his being unbroken. The market value of a good colt is lessened by from twenty to fifty dollars, or even more, by this circumstance; and, as a rule, the young horse trained for service, for either the saddle or harness, is worth fifty per cent. more upon that account than he was before. Thousands of our stock-raisers submit to this pecuniary loss every year, rather than undertake the labor of breaking, which their timidity or indolence shrinks from.

It is comparatively a rare thing in this country to meet with a man that has taken pains to inform himself thoroughly concerning the best modes of gentling the horse and training him for the different uses. The common—we had almost said the nearly universal—practice is to let the colt run unbroken until he is considered of suitable age to be put to work, and then to harness him forthwith beside some sedate old horse in a large wagon, and reduce him to submission at once. This is a very injudicious process, to say the least of it, often proving dangerous to the other horse, or the manager of the team, and still more frequently ending in sad injury to the colt. Nor is it a successful method. Few colts can be said to be well-broken, or safe, when brought into service in so rapid and abrupt a manner. How many horses there are spoiled in breaking, so that they are always unreliable to work, or else can not be worked at all! Such will continue to be the case until a better and more judicious system prevails in regard to these matters. One horse out of every five will be spoiled in breaking, either for the harness or the saddle, or for both. The terrible case of lock-jaw described in Chapter VII might be cited as an example of the evils which flow from the unthoughtful management so common among our farmers.

The public mind does not seem to be educated up to the level necessary for a proper understanding of this subject; but probably this proceeds more from a lack of popular information concerning it than from any other circumstance. It is certainly no small source of the difficulty that there is so inconsiderable an amount of reading matter upon it accessible to the mass of farmers. We have no American work on the horse treating of these topics at all, and but one from abroad that has attained any respectable circulation in our country; and, although this is an invaluable authority, in many respects, it is, upon the whole, illy adapted to the peculiar wants of the horseman in America. The consequence of this is, that here almost every man has his own way, differing from that of all his neighbors, and no sys-

tematic mode is to be found in general practice anywhere. Yet, there is much less to be said concerning the defects of the multiform and diverse modes existing in the United States than of the almost entire neglect of all modes. So many hundreds have we seen in our time who gave the subject no attention whatever, and, when spoken to in regard to the advantages of a systematic course of training for young colts, would reply, with all the self-satisfaction characteristic of ingrained stupidity, "Well, the old plan is good enough for me; it is the way I used to see it done when I was a boy, and suits *me* very well."

So far as the general management of the horse is concerned, there has been but little improvement in many parts of the land within the memory of even that fabulous individual, "the oldest inhabitant." In some sections, it is true, enterprising men have taken hold of the matter and pushed forward the good work, greatly to their own advantage and that, also, of the communities among whom they reside. But, as exceedingly few, or perhaps none, of these gentlemen have ever enlightened the general public, to any great extent, through the medium of the press, the benefits of their improved methods have been restricted to quite circumscribed territorial limits.

There can be no doubt that the loss to the total wealth of the country resulting from the inferior training of our horses would reach a startling aggregate, if it could only be put into figures. We have few thoroughly-trained horses for either the harness or saddle. The great fault lies in neglecting to begin the work at the proper time. The colt may be educated as well as the child—not to the same extent, of course, but with an equal degree of certainty. In the main, the rules which govern in one case are applicable in the other, also. As more than one wise man has said that childhood is the most favorable time for education, and that it is never too early to begin, so the wisest of veterinarians will agree that the best time to commence training the horse is before he has outgrown the condition of

THE YOUNG COLT.

Take him in hand at once, and gentle him. Do not let ive days pass after he is foaled until you begin to handle im. Never let the colt know what fear is, and yet you nust control him. Be certain to hold him fast before he ecomes strong enough to break away from you. There ever should be a time when the colt does not recognize the nastery of his keeper, and the necessity for obedience. Nevertheless, every attention bestowed upon the little fellow should e gentle and kind. No one should be permitted to frighten im or to strike him with a whip; he will always remember , and will probably shy from the latter as long as he lives. n after years the use of the whip may sometimes be necesary, but at this tender age the colt should not know that uch a thing exists.

The foal should be handled every day until he is perfectly entle, and all timidity and shyness have vanished. By a ttle habitual patting and caressing, he will become very rongly attached to his master. The colt that is allowed to un until he is six months old, or more, and has no other nowledge of his master except as a terrible monster to be ared, or is in the habit of shying away from him, will selom get over this feeling entirely. It is at this early age nat most of the vices of the mature horses are begotten.

An important truth, which stock-raisers and owners of oung colts seem nearly always to overlook, is that the colt ft to himself, without proper training, will just as certainly un into bad habits, and those vices which so much detract om the value of many horses, as that the child will go to in when he is left to himself. The instructions of the Dine Word are to "train up a child in the way he should go, nd when he is old he will not depart from it." The same ndamental law of education applies to the colt; and as "a hild left to himself bringeth his mother to shame," so a colt ft to himself bringeth his master into trouble, and it may e very serious trouble.

The colt must be kept from the vices which curse and ruin so many horses; or, if he has unfortunately fallen into any of them, he must be broken of them—now in his tender years, before his habits become strengthened and inveterate through long continuance in them. The man who, having much to do with horses or colts, has not learned that they are the creatures of habit, has studied his business to but very little purpose, if he has studied it all. Bad habits must be either broken or prevented, and here, most emphatically, the stock-raiser will find it true that "an ounce of prevention is worth a pound of cure." It is much easier to keep the colt from ever acquiring ugly tricks than it is to break the mature horse of any settled vice.

If the work of educating the young colt be neglected, no subsequent pains will be likely to make good the deficiency. As "youth is the seed-time of life," and the favorable time for improvement, so is the colt's age the proper time for beginning the instructions to be imparted to the horse. The colt of three or four years, unbroken and untamed, is like the youth who has never known parental control. What ignorance do we find in both—what indolence, what obstinacy, what impatience of restraint, what rebellion against government, no matter how mild and judicious! Is not this the history of many horses and of their vices, such as backing, shying, kicking, rearing, running away, breaking the halter, continued restiveness, and others of similar character? The farmer does, indeed, pay dearly for his neglect in regard to training his young stock.

Every farmer should likewise consider within himself what each of his colts is best suited for, what place the young animal shall be destined to fill; and, as soon as this point is settled, he should go to work at once and conduct the whole process of training with a view to the especial purpose selected. All this, too, can be done at a very early age better than later. It may be laid down as a rule that the colt is susceptible of training for whatever service is desired of him, and that no failures would occur if his peculiar adaptedness

were properly studied and understood. We may mold and fashion his disposition, control his actions, teach him obedience and submission, and habituate him to the performance of whatever duty is deemed best for him. If properly trained, he will be safe and true, and utterly free from vice, in almost every instance.

The process of gentling should be carried on as opportunity offers—by lifting his legs and feeling of them frequently, handling his head and ears, stroking his neck and body, and occasionally by opening his mouth. Not only should all this take place before weaning-time, while the colt is still with his mother, but a great deal more besides. The bridle may be shortened and the bit put into his mouth. The bit should be a very small one, and handled carefully, so as not to hurt his mouth. He may be allowed to champ it for a time, but should never be hitched or led about with the bridle upon the first occasion of its use. After he has become somewhat accustomed to wearing it, as he will when it has been put on three or four times, he may be led about with it, a little longer and further each time. The first few times this is done it should be by the side of his mother, and while she is being led along; then he may follow at a little distance behind her, and presently he may be taken a few paces in advance of her.

It should be some time before he is tied. When ready for this part of his training, especially if he is to be made stand by himself, it would be best to have a good, strong halter, so as not to hurt his mouth. Be as kind and gentle toward him as possible, but always continuing the attitude of a master. He must be made to understand that the keeper's will is his highest law, and that no alternative is open to his choice, but obedience alone is possible. Do not suffer him, at any time, to obtain any advantage in pulling about by the halter or bridle, or in running away. One time of the latter occurrence may nearly ruin him. It will take months of careful management to correct its evil effects, and often it forms the beginning of a series of bad habits. As he be-

comes familiarized to standing hitched by the bridle, he should be left thus somewhat longer, from time to time.

The next thing in order is to accustom him to the saddle. A small one should be procured, laid gently on his back, and then removed without the girth having been buckled. This course may be continued until all fear of the strange weight is removed, when the girths may be fastened about him. If a saddle of small size, such as will fit his back, can not be procured, a bag or blanket may be used, and similarly fastened, and thus will answer nearly the same purpose.

The person who feeds the colt is the one to gentle and train him. It will be of great benefit, in this process, to select such bits of food as the colt can eat, and give it to him from the hand. By this course he learns from whom it is that he receives his food, and his friendship is readily secured. The work of gentling is well done only when the colt is *perfectly* gentle, all his fears of man are removed, and he will allow himself to be handled with the utmost freedom. The great objects to be accomplished are to gain his entire confidence, and to accustom him to the most implicit obedience, both at once. When this is the case, his training becomes an easy matter, and his future usefulness is assured. These ends can best be attained, in all cases, by kindness and moderation. The many failures that attend the labor of breaking are generally the consequence of a neglected colthood, and of harsh, rough usage subsequently. "There is no fault," says Youatt, "for which a breeder should so invariably discharge his servant as cruelty, or even harshness, toward the rising stock; for the principle on which their after usefulness is founded is early attachment to and confidence in man, and obedience, implicit obedience, resulting principally from this."

THE ONE-YEAR OLD COLT.

At one-year old, the colt should be perfectly gentle, and familiar with the halter, bridle, saddle, and the different parts of the harness, and should be accustomed to follow readily when led by either the halter or bridle, and to stand tied

either in company with other horses or alone. A good beginning will now have been made, a foundation laid upon correct principles, and what remains to be done, though it is a great deal and very important, will come almost in the natural order of things.

The colt should be tied occasionally by the side of some old and steady horse in the shafts, at first walking along the road in this way for half a mile or so. When this has been done a few times, so that he has become used to the shaking of the harness and the motion of the wheels, the pair may be put to a slow trot on some level piece of road. Under such discipline, he will soon learn that he is not to be hurt, while his former experience will not leave him in any doubt as to the necessity of submitting to what is required of him, and thus he will soon learn to regard these new movements as quite in the line of his duty.

Before he is quite ready to change places with the old horse, and step into the shafts, he must be taught the use and guidance of the lines. The old horse should not now be hitched to the shafts at all, but the harness, including the lines, be transferred to his young companion; and then, with some one to lead, let them be driven around a few times in company. The old horse may next be unfastened, and the colt driven with the lines by himself, some one walking by his head. This exercise should be continued until he becomes thoroughly accustomed to it, and especially to being guided by the lines. When sufficiently trained in this way, he may be put into the shafts, which should be gently lowered upon his sides several times in succession, until he understands what they are, and how little he has to fear from their touch.

A light buggy or gig may be pulled along after him, at this stage of the proceedings, but for no great distance, with the colt between the shafts, yet not fastened to them. After a little while, the traces may be made fast, and then, with the old horse by his side, he may take his first lessons in drawing the buggy, which are to be commenced slowly and carefully. First move the old horse along, when the colt

will naturally move off also, and ought not to be allowed to stop until he becomes evidently tired. The old horse, throughout this exercise, should have a saddle on and the bridle over his neck, ready for riding. If the colt moves off freely and kindly, after a few minutes let the person at the head lead the old horse a little way in advance, gradually increasing the distance until he is several lengths ahead of the colt in the shafts. Without stopping the old horse, let the assistant now spring into the saddle, and keep lengthening the interval between himself and the buggy, until, at length, the old horse is taken entirely out of sight of the colt.

All this should be attended to on level ground, and with a very light vehicle. If carried out with care and kindness, this method will never fail of success. We can not too strongly insist upon the happy mingling of gentleness and firmness, which should characterize the young animal's treatment throughout, or censure too severely harshness or irresolution. If the colt stops, let him stand for a time, and then, with gentle urgings, he will start on again. This he should be taught to do, in fact, before being separated from the old horse; and not only this, but even to back a little, which is likely to prove one of his hardest lessons. Very slight efforts should be used at first to make him back, as he will resist them with considerable obstinacy. It will be sufficient to induce him to take two or three steps backward, adding another step each time the exercise is repeated, until he becomes used to it.

All of these performances are designed to accustom the colt to the bridle, the saddle, the harness, the shafts of the buggy, and the guidance of the lines, and to complete the work of gentling before he has strength or inclination to disobey. To these ends, he should be exercised frequently, but without requiring from him any real labor while so young and tender.

THE COLT AT TWO YEARS OLD.

During his third year, the colt should be continued in the same training as before, and occasionally he may make short

trips in the buggy or other light vehicle, but should never be driven more than three or four miles at a time. If there be any considerable hill, the wheel should be locked going down it, and when ascending it the driver should walk alongside, so that the colt may have nothing but the vehicle to pull.

This is the time to train him for the saddle also. A small boy—say one of ten or twelve years old—may get on his back, and, after sitting there a short time, should get off again. The first time he is mounted there should be no attempt to ride him around; he is to be gradually taught this lesson, as every other. He should be exercised in this way as often as convenient; the oftener the better. But in no case should any one be allowed to *jump* on his back. The boy that mounts him should either be assisted to do so, or should stand upon some elevation, and then get on as easily and lightly as possible. Great injury has resulted from a violation of these rules. The bones of the back have not yet the strength and solidity belonging to the full-grown horse, and, if persons are in the habit of jumping suddenly upon him, there is great danger that he may be disfigured for life, from that unsightly appearance called sway-back. (See Chapter III.) The colt should be ridden often, not merely for the purpose of gentling him, but to accustom him to the road and the different objects to be met with along the way.

BREAKING.

If the judicious course recommended in the preceding sections of this chapter has been systematically carried out, the farmer will find the great bugbear of "breaking," as it now is to so many, well-nigh disposed of already, so that all which now remains is to put the young animal at work, when the proper time comes, and gradually habituate him to regular, continuous labor. It is much to be regretted, however, that all farmers who own colts do not appreciate the importance of attending to the work of gentling and training during the susceptible years of the colt age. Such is the case, un-

fortunately, with the great majority of them in the United States. The loss sustained in consequence of this negligence is tenfold greater than they are aware.

To what we have already said upon these important topics, we may here add the emphatic testimony of Youatt. He says: "The process of breaking-in should commence from the very period of weaning;" and, again, "The foal should be early handled, * * * accustomed to the halter when led about, and even tied up. The tractability and good temper and value of the horse depend a great deal more upon this than breeders are aware."

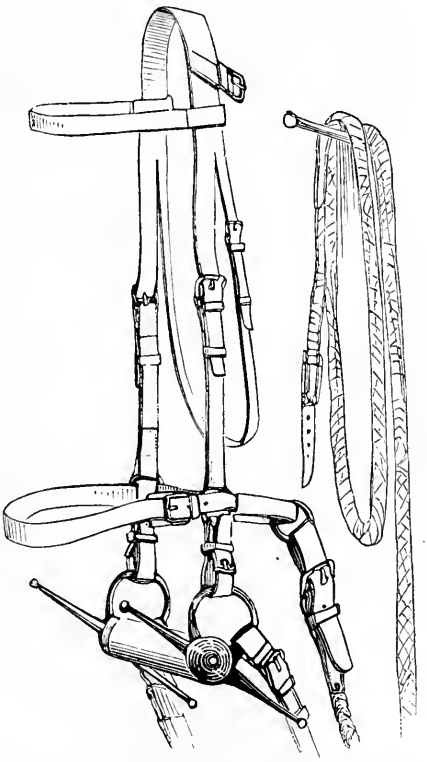
As it is, the colt is generally left until he is old enough to be put to work, and then taken up, wild and vicious, at the age of three years or more, to be broken to service. Such a horse will but seldom be perfectly gentle, and, in consequence, some of his best capabilities will remain only partially developed. The most favorable opportunities, by far, have been lost, yet the wild colt must not be neglected and given over as untamable and useless. From a former age there has been handed down to our farmers a rough, dangerous, and seldom wholly successful method of breaking—that of thrusting the wild colt into the harness, and before the wagon, by the side of some large horse, and simply enduring his kicking, rearing, and plunging, until, from sheer exhaustion, the animal, blowing and all afoam, is reduced to some degree of sullen obedience. Happily, this is being superseded, among the more intelligent and better-informed class of stock-raisers, by other modes more rational and generous. The most famous and, without doubt, the most successful of them all, is that known as

THE RAREY METHOD.

This derives its name from the fact that it was first carried to perfection and given a world-wide celebrity by the late Mr. John S. Rarey, of Groveport, Franklin County, Ohio, although it was not wholly original with him. That gentleman's experience in training young colts and in tam-

ing the vicious of a larger growth was quite extensive and very successful in our own country. In 1858 he went to England, and created such a *furore* there that, it is said, the gross proceeds of his exhibitions, lessons, etc., amounted to the snug sum of £25,000, or about $120,000.

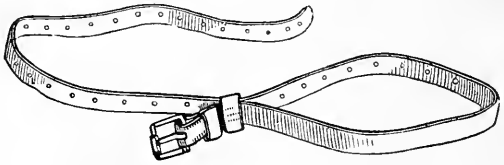
The annexed engraving represents the halter recommended by Mr. Rarey for all purposes, with the addition of his ordinary breaking-bit. The halter is of leather, and made like an ordinary head-stall, but rather lighter. A leading-strap being buckled to the nose-band, either before or behind, any thing may be done with the colt short of mounting. The method by which this halter is converted into a very useful breaking-bridle is quite simple, consisting merely in attaching any bit which may be selected to the rings connecting the check-pieces to the nose-band. The attachment is made by means of two small billets and buckles, as shown in the cut.



MR. RAREY'S HALTER, OR BRIDLE, FOR COLTS.

The "Rarey mode" consists in conquering the animal by depriving him of the use of his limbs, and making him feel that he is utterly powerless in the hands of the operator, and must submit to whatever is required of him. In other words, it carries the unbroken horse or colt through a rapid and vig-

orous course of training, which is both systematic and severe, and embraces, in a short space of time, all the essential lessons that are to be taught him—all that has been neglected in a previous lifetime. As a means of taming wild and vicious horses, it is, beyond question, the best method known; and its ease, rapidity, and almost invariable success renders it a most important step forward in the science of horse-breaking. No person who thoroughly understands it would now think of going back to any of the older practices.

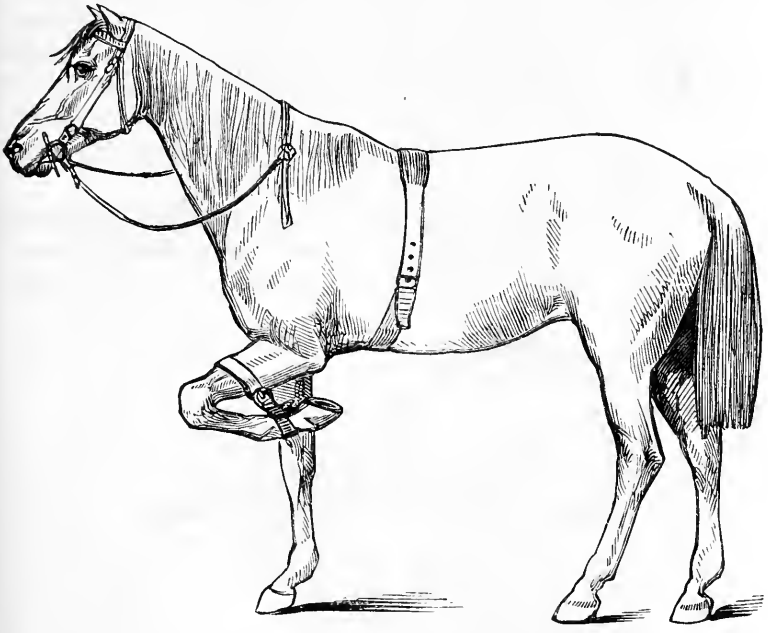


THE RAREY KNEE-STRAP.

The first step, of course, is to halter the animal, which it is by no means an easy matter to do in many cases. To effect this purpose, Mr. Rarey and his pupils are said to have resorted occasionally to the use of certain drugs. Their method of procedure, it is stated, was in accordance with the following directions: "Rub a little of the oil of cummin upon your hands, and approach the horse upon the windward side, so that he will smell the cummin. The horse will permit you to come up to him without any trouble. Rub your hand gently over the nose, so as to get a little of the oil on it, and you can lead him anywhere. Put eight drops of the oil of rhodium into a silver thimble; very gently open the horse's mouth, and turn the oil in the thimble upon his tongue, and he will follow you like a pet dog, and is your pupil and your friend." The use of any sort of drugs or essences, in connection with horse-training, is of doubtful propriety in any case, yet is, perhaps, admissible when employed to catch a brute that is otherwise unapproachable. It may well be questioned whether such agencies do not prove injurious to the horse; and even if this be not so, their good effects are of too transient a nature to

endow them with any great value. The owner should beware of confiding too much in their supposed benefits, or he may suddenly get into danger from his vicious animal.

After the horse is bridled, the next step is to throw him upon his side, which may be done quite easily and without

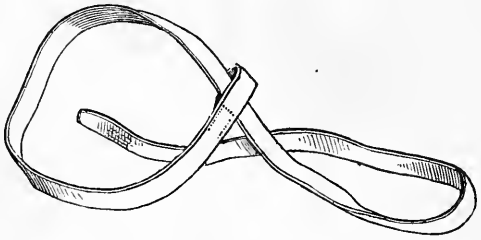


THE USE OF THE KNEE-STRAP.

any risk by means of two straps. The first of these should be a strong strap of thick leather, two feet long, and at least an inch in width. It is so well represented in the accompanying cut that any further description is unnecessary. The end without the buckle should be fastened to the buckle, about twenty inches from the latter. The left foot is lifted up to the body, an assistant, meanwhile, managing the bridle, and the strap is slipped over the knee, and pushed up over the lower pastern joint over the ankle and close to the body of the arm; or, if the strap is furnished with the large loop

shown in the engraving, it will be necessary to lift the leg first, and then buckle the strap. The animal now stands on three legs, and is utterly incapable of doing any mischief, unless it be with the teeth. Let him remain thus for five or ten minutes. If the knee-strap does not hold the foot pretty close to the body, draw the buckle a little tighter. If he springs and jumps about, let him have bridle-room, and satisfy himself that he is securely fastened and can not get his foot down. The annexed engraving, which is a sketch of "Cruiser," Mr. Rarey's most celebrated conquest, at the second stage of the preparations for his taming, well indicates the application of this strap.

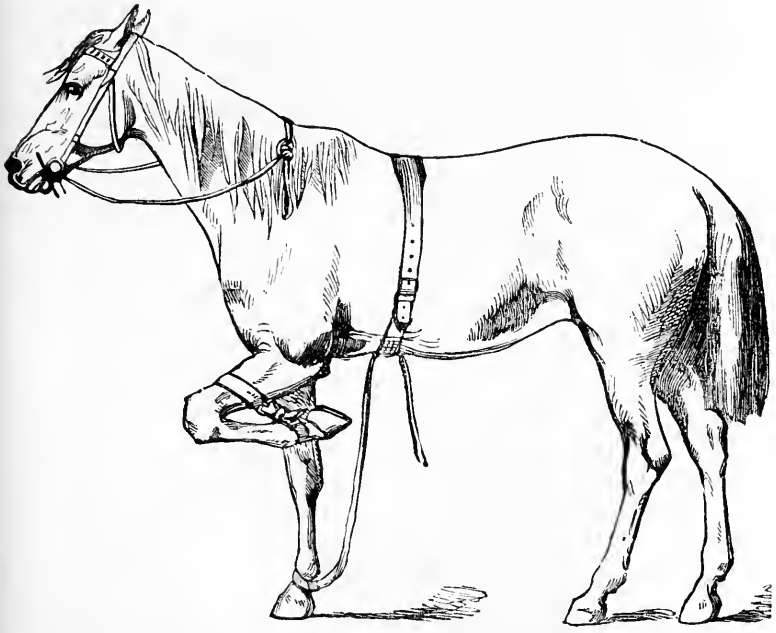
The second strap should be six feet long, and furnished with an inch-and-a-half ring at one end, securedly sewed fast. When used in connection with the surcingle, as Mr.



THE RAREY LEG-STRAP.

Rarey's practice was, it need not be so long; and, in any case, a good, stout leather loop, such as is shown in the subjoined cut, will be better than the iron ring. The strap is to be noosed around the ankle of the right fore-foot, the end extending over the animal's shoulders, and held firmly in the right hand of the operator, who stands abreast the left shoulder, and jerks up the right fore-foot, when the horse falls, of course, upon his knees. Here he must remain, if the assistant, who manages the bridle, does his duty, and the operator himself keeps the strap around the right foot drawn tightly over the top of the shoulders. He may struggle violently, and try to get up from his kneeling posture, but, by

keeping his head down and his right foot well up, he will soon grow tired of this, and, before long, show a disposition to lie down. The operator should encourage him to do so by kind, soothing words, and, with one hand in the mangle, try to pull him over on the left side, while with the other hand he should be rubbed and carressed. The assist-



MR. RAREY'S APPARATUS ARRANGED FOR THE FINAL STRUGGLE.

ant, holding the bridle, should turn the head toward the right side, to facilitate the movement, and to compel him to fall, when he finally concludes to do so, upon the left side, so that his back will be toward the operator. His struggles may now begin again, but if his head is held firmly to the ground, and his left foot firmly kept back, he will soon give over.

We have described these operations as the work of two men, because, in this way, the process becomes so simple and

easy that no intelligent farmer or farm-hand, of ordinary strength and activity, need be afraid to subject his powers to the experimental test of the Rarey method. But in Mr. Rarey's own practice and instructions no assistant was allowed the operator—a limitation which was compensated in a slight degree, however, by the addition of a surcingle, buckled on as represented in the portrait of "Cruiser," page 509, and also in that on page 511, which shows the whole apparatus arranged for the final struggle between the horse and his tamer. Here it will be seen that the leg-strap is passed through the surcingle, under the belly. It is grasped by the right hand, well gloved, just back of the surcingle, while the left hand manages the bridle-reins. The horse is urged to move a little, which he can only do by hopping, when suddenly the left leg is drawn up to the surcingle and there kept. At this, he falls on his knees, of course; but, if possessed of any spirit, he will soon begin bounding into the air upon his hind legs; and then the operator must be active and on the alert, using both hands, as above directed, to the best possible advantage, and never getting so far forward as to expose himself to the danger of being caught under the horse when he falls upon his knees. Sooner or later the animal will become exhausted, whether he resists by violent plunges or sulkily remains on his knees, and when this takes place he will be glad to lie down of his own accord. The right rein must be kept tight, so as to keep his head turned away toward the off-side, and, if need be, the operator may use the further argument of a little pressure, exerted to pull the horse toward himself. A man of nerve and activity, especially after he has had a little experience, is likely to prefer carrying the process through without the aid of an assistant.

Once fairly subdued by these means, and lying upon his side, the horse will be indisposed to get up for the present, and now comes the golden opportunity for profiting by all that is past. The animal must be treated with the utmost gentleness, and every effort made to quiet his fears and

soothe his terrible excitement, which often causes him to tremble exceedingly. He must be convinced that, although completely mastered, he is in no way to be hurt. Confidence must replace terror, and docility his stubborn or vicious waywardness. Let the operator stroke his hair with the hand; pat his body, neck, and head; handle his feet, legs, and ears, and, in fact, all parts of his body, accompanying all this with kind and reassuring words. The man may now sit down upon him, turn around from side to side, lie down upon him, etc. The more motions and changes that can be gone through with the better.

THE HORSE TAMED BY RAREY'S METHOD.

The saddle should be brought and gently laid upon him, the stirrups hanging on each side of his body; likewise all parts of the harness, piece by piece, and the chains, if they are to be used, laid across the prostrate form. After these maneuvers have been carried forward for half an hour, or thereabouts, and all signs of fear seem to have departed, the

straps (and surcingle, if one has been employed) may be removed, the head liberated, and the horse encouraged to rise to his feet. Many persons make the animals undergoing this process lie down in this way a number of times, until they readily submit to the operation, and fall first upon their knees and then upon their sides, almost at the word of command, and until the last vestiges of fear of saddle, harness, chains, and even shafts, have vanished. It is astonishing how quickly this will follow when once the horse is conquered. He may be taught obedience in almost every particular. But this requires constant, close attention, and great patience, and sometimes the work of breaking is not completed short of some days.

Some persons bring the buggy and lay the shafts on the horse while he is down, and let the wheels pass around him near his body. After he is on his feet again, the saddle may be brought and laid carefully on his back. If he submits to this, well; if not, he must be taken through another course of exercise on his side, and this must be continued until he is willing to allow not only the saddle to be put on him but every portion of the harness as well. Only one piece of the gearing should be tried on him at a time, and, if he scares or jumps at any of these, remove them and lay him down again, and take him through another course of exercise.

The first time that he is ridden, it should be in the stable, where he has been laid on his side; and here he may be mounted by some lad, just as he has risen from his recumbent position, and led around the stable several times with the young rider on his bare back. This operation must be frequently repeated, until he becomes accustomed to the burden. He should not be hitched up in the shafts until he has become perfectly familiar with them, and all traces of fear have disappeared. He may be prepared for hitching up by being led into the shafts frequently, when they may be lifted by his side, raised up and down, etc., until he is satisfied they will not harm him. If he jumps about and shows any timidity, continue the lesson till he submits, and will permit

he shafts to be laid upon his back or neck, or by his side. f he is obstinately fractious or scary, lock up his fore-feet, tc., again. Under such discipline he can not long hold ut.

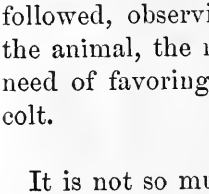
Whatever you undertake to teach him, persevere in the nstructions until you succeed. If the horse has been thor- ughly worn-out and conquered at the outset, there will not e much trouble subsequently; but, unless that has been one, it will be a somewhat prolonged course before he is rought under proper subjection. But always remain kind, hough firm. Allow no harsh words or measures of any ind. Let all your handling of him be gentle and soothing, emembering that the law of kindness is always more potent han that of force. After the harness has been put on, an ssistant may go behind him, and, taking the traces in his ands, pull back, so that a gentle pressure will be brought to ear upon his shoulders; and when he has kindly submitted this, he may be hitched up in the buggy, and gently started f in it.

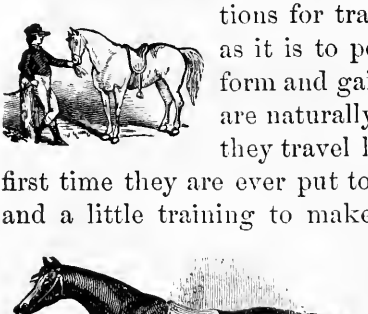
Another plan, besides that here indicated, for familiarizing im with the shafts is the method laid down in a preceding ction of this chapter for the training of the one-year-old olt; namely, to hitch him by the side of another very gentle orse, harnessed in the buggy, and, with their heads tied ite close together, to drive them around until the un- roken one will lead kindly beside the other. When this is ecomplished, the two may change places, and the exercise sumed as before. Still another mode, which is in prac- ce to some extent, is to hitch the unbroken horse in a cart, d put in a very strong though gentle horse before him, e two thus forming a "tandem." The management of e hinder one, by either leading or driving, will be work hough for one person. After a time the forward horse ay be unhitched, and led in advance of the colt, the dis- nce being gradually increased until the novice finds he n go alone, when the old horse may be taken off the field tirely.

When the process of breaking is commenced, it should be pursued vigorously every day, until the wild horse is thoroughly and completely broken; and when put in the shafts he should be driven freely. With such an animal energetic measures are necessary to teach him that you are his master, and that he must submit to your control. Do not begin the arduous task of breaking him until you have the harness, and every thing else that you expect to use, ready at hand, and strong; and then keep him going until he is conquered, broken, and trained. The directions given in the case of the young colt for starting, backing, and holding back in going down hill will apply none the less here, and ought to be fully followed, observing only this difference, that the stronger the animal, the more he can bear. There will be much less need of favoring him, of course, than the young and tender colt.

SADDLE HORSES.

It is not so much our purpose to enter into detailed directions for training the horse for the saddle as it is to point out natural adaptedness of form and gait for this purpose. Some horses are naturally so well suited for this use that they travel lightly, and with ease, from the first time they are ever put to it, and such only need control and a little training to make most excellent saddle-horses.





A particular form or build of the horse generally brings about this result. Light, clean limbs; a quick, ready step high and free; the hips dropping from the top downward to the roots of the tail; the tail low, and well-set in the hips. These are the qualities indicative of a good saddle-horse, and of which none being present it is useless to attempt to make the horse a desirable hackney. Many horses exceedingly valuable in other capaci

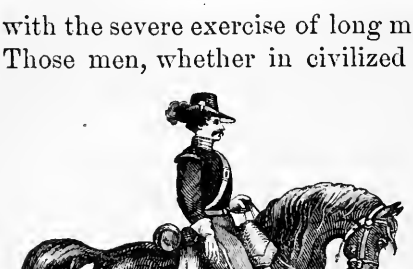
ies are of no account in this one. Their feet are large and coarse; they lack quickness and suppleness; their motions are dull and heavy, and they drag their hind limbs along in a most awkward, sluggish manner. High, sharp shoulders and hips, with the tail set high—almost on a level, in fact, with the top of the hips—never belong to a good saddle-horse.

There is a breed of pacing horses in our country that almost invariably make excellent saddle-horses. These are natural pacers, taking to this movement almost from their births and having no other traveling gait. Horses not naturally pacers are often broken to the gait by tying a short side-line to the right side of the bit, and then to the stirrup, so that the head will be pulled to the right every time a step is taken. The same end will be answered by holding the right rein loosely drawn with the hand, thus giving the horse in his forward progress a rocking motion. Other means have occasionally been practiced to break the horse to this gait. The horse that is not naturally a pacer is seldom a very desirable animal under the saddle when made such by artificial means.

Another exceedingly pleasant and easy gait is the "fox-trot," as it is called, which may be taught almost any horse of small, clean limbs and feet, and a quick, active step. This is done by gradually forcing the animal into a movement faster than a walk, but never allowing him to strike a trot. Continued careful practice will make this motion a confirmed habit.

In the army, officers' and cavalry horses are preferably chosen from natural trotters, their gait being one consistent

with the severe exercise of long marches and great endurance. Those men, whether in civilized or other lands, who spend most of their lives in the saddle, seldom practice their horses in more than two movements faster than a walk—the trot and the gallop. A sustained, rapid trot is a hard gait for the inexperienced rider; but, when one is inured to it, no other seems comparable with it for long journeys. General Sheridan's famous black stallion, which bore him to the field of Opequan Creek from Winchester, "twenty miles away"—an occasion already celebrated in history and song—is said to have been one of the hardest-gaited horses that man ever bestrode—one which it would be a sore task for many a professional jockey to have to ride.



HORSES FOR THE BUGGY AND CARRIAGE.

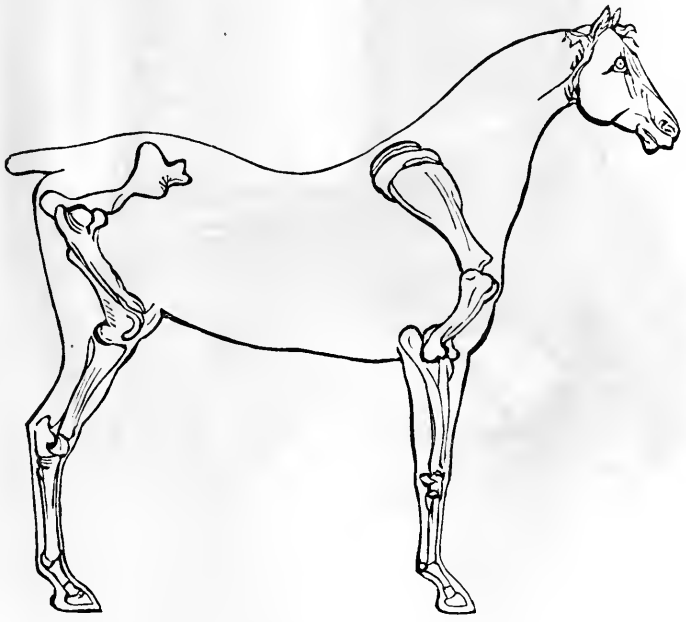
Usually, the horse of the American farmer must be somewhat accustomed to almost every variety of exercise—to the saddle, the buggy, and the carriage as well as the plow and the wagon. Hard labor, on the road or in the field, impairs the qualities for use under the saddle, and the farm-horse is not generally well suited to the carriage. Yet, a horse of fine form and limb will always be more active in the shafts of any vehicle than one that is coarse and raw-boned.

The best carriage-horses are not those of largest size. They should have height and length, but the body should be light and compact, with small, clean limbs, and a hard mus-

cle. Let this be the mold from which all selections are made of horses for the buggy and carriage. It is the most beautiful, no less than the most serviceable. Directions have already been given in the preceding section of this chapter for breaking the colt and the horse for these uses. Constant exercise in the carriage is essential to perfection of training. Horses that are matched, or those that habitually work together, should be often changed from side to side. This will prevent or break up certain bad habits that such horses are apt to contract when always placed on the same side.

DRAUGHT HORSES.

These embrace the heaviest and strongest breeds of horses. Large feet and legs are quite in place here, with powerful



joints and muscles; but, of course, it is utterly out of the question to expect rapidity of motion from a draught horse.

A DRAUGHT HORSE.

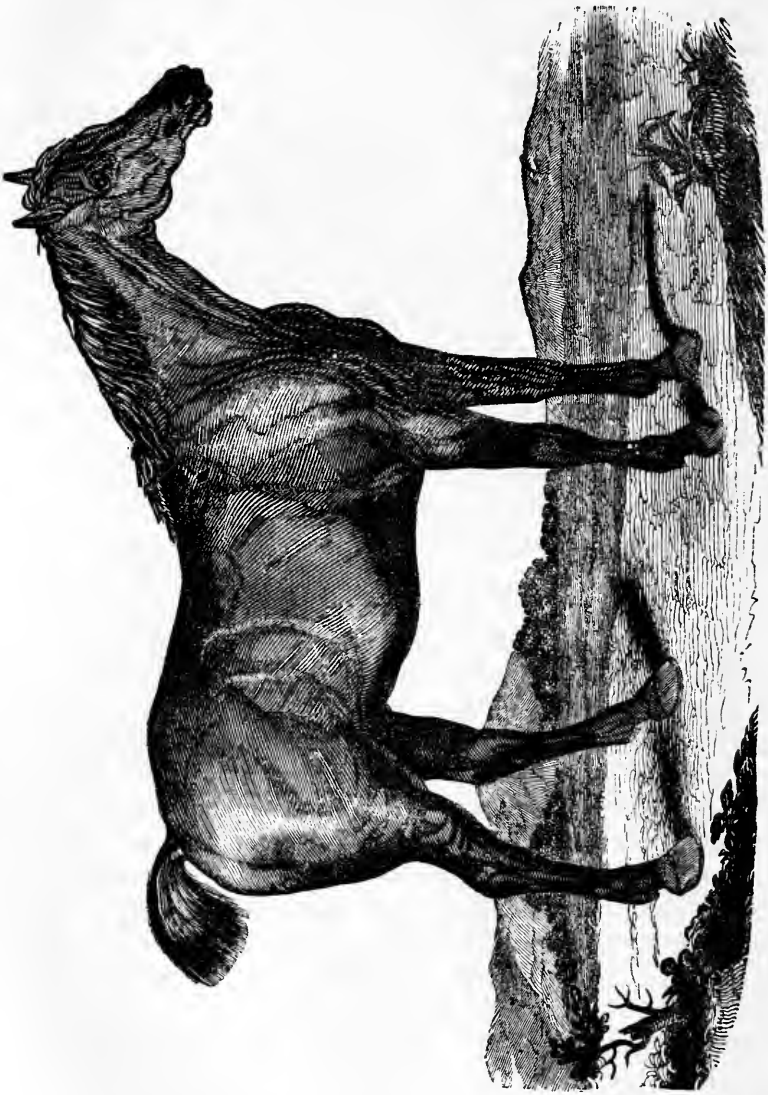
The Dutch horse, originally from Pennsylvania, is the one most used in this country for the constant wear and tear of heavy wagoning, and similar labors, and for these purposes possesses a peculiar adaptedness.

In the draught horse it is desirable that there be a much less slanting direction of the shoulder—that is, of the scapula (see 13, in cut on page 24)—than in the horse designed for rapid motion, in order that there may be more weight thrown into the collar, and that the burden of the draught may be more equally distributed along the whole length of the shoulder. Such a conformation, however, always indicates the capabilities of a slow, steady plodder merely. In regard to this particular, the artist who executed the full-page illustration opposite could hardly have had a fair specimen of the class for a model. An oblique shoulder is an essential prerequisite to speed, and especially to a maintenance of it. The engraving on page 519 shows the relative situations of the bones of the fore and hind extremities, and will doubtless assist our readers to understand the subject more clearly.

ROADSTERS

Under this designation may be classed the stage and omnibus horses, those for passenger carriages, saddle horses used habitually for long journeys, etc. The draught horse is by no means suited for these purposes, being too heavy and slow, and soon breaking down. The horse of small body and good length, with light, active limbs, is best adapted to the road. There is no better stock known for these employments than a cross with the Arabian or the Andalusian. The roadster should have no surplus flesh; his muscles must be hard and compact, his limbs well-shaped and trim, his joints full and round, and his foot and ankle sloping backward at an angle of forty-five degrees from the point of the toe.

There are some horses with long bodies and quite short legs, and these make the worst roadsters in the world. The length of the body and that of the limbs should correspond. Some long legs, also, are very objectionable—too small, yet



A ROADSTER.

nearly as large at the ankle as they are next the body; the joints are too small and flat, and the ankles too straight, while the foot is round and "clumped." Horses no better limbed than this can possess no endurance on the road, and are very apt to be stumblers.

The friendly-looking old customer opposite has evidently seen a considerable share of hard service in his day, but is still quite willing to do his part again whenever called upon. He is one of the stoutest built animals of his class.

MULE BREAKING, TRAINING, ETC.

On these heads not much need be said. The mule requires but little breaking or training, taking to work almost as though it was natural to him. He should be handled while a colt, and broken to the halter, and also to the saddle, if desired. Further than this not much is required until he is three years old, which is the proper age for the mule colt to begin to work. Then, if already halter-broken, he may at once be hitched up in the plow or wagon, by the side of another steady mule or horse, and at the end of the first day he will be as well broken as many a horse-colt will be at the end of a fortnight or a month.

There are two classes of mules—the large and the small. The former are safest and most gentle. They are excellent for draught, while some of them make very fine matches for the carriage, in which they work well. In the buggy, also, they look finely. We hardly think a finer span can be turned out anywhere than a pair of large, well-formed black mules, with tail-hairs clipped and mane roached, well caparisoned, and before a nice carriage. In such capacities they are much in use in many parts of the South, where they are great favorites. They are much safer than horses. Some of them make splendid animals under the saddle; and, in fact, the finest pacer we ever saw was a large, light bay mule, in Gibson County, Tennessee.

Small mules are more hardy than large ones, but not so reliable, and sometimes they are a little vicious and in-

tractable, especially in respect to kicking. Nor are they very safe or pleasant to ride. For ordinary farm-work, however, they are the most valuable animals in the world. A small, compactly-built mule will do more work in the plow or before the wagon than the best substitute the farmer can find.

CHAPTER XXI.

FRACTURES.

It is not often that any of the bones in the horse's frame are broken; but decidedly the most common occurrences of this kind take place at the hip and the hock, as described in appropriate sections of Chapter III. Fractures are of two kinds—simple and compound. In the former but one bone is broken, and does not protrude through the skin; in the latter either one or two bones are broken, and the surrounding ligaments are lacerated, so that the bone protrudes to or through the skin.

FRACTURE OF THE SKULL.

Occasionally the bones of the skull are fractured. Such cases nearly always terminate in death, sooner or later. Sometimes the sufferer seems greatly better—so much so, indeed, as to be returned to his customary duties; but there is danger of his falling dead upon any occasion of unusual exertion, or else apoplexy may set in and end his days. An injury of this character will be accompanied by slight convulsive motions of the entire body, by a hard, laborious breathing, and by a staggering gait. The eyes will be nearly closed, or sometimes quite so, the head carried hanging down, the lips pendent, and the saliva often flowing freely from the mouth. There is no remedy for a fractured skull.

More injuries of this kind happen than farmers are aware of. The cause is generally the infliction of a severe blow upon the head by an enraged teamster, costing the owner the life of a valuable animal. If such blows do not fracture the cranium, and thus kill the horse, they are extremely apt to produce concussion of the brain, which results in mate-

rial injury of a permanent nature. Especially is there danger of its destroying the sight or hearing of the poor creature. We have been the unwilling spectator of several cases of beating over the head, until the water ran from the horse's eyes; and then, within a few months subsequently, have seen the eyes of the same horse become milky, the case terminating presently in confirmed moon-blindness, as it is incorrectly called. The instances of stupid, doltish horses reduced to this condition by such brutal violence are not a few. The greatest misfortune, oftentimes, is, that the owner is kept in ignorance of what has transpired. He soon discovers the sad effects of the brutality, but never learns the true cause.

FRACTURE OF THE NASAL BONES.

It is strange how unobservant some men are in regard to their horses. We have seen the bones of the nose fractured so badly as quite to disfigure the animal, and all the while the owner seemed wholly ignorant that any thing was wrong. These cases generally get well of themselves, unless the bones are bent inward considerably, in which case it will require the instruments of the surgeon to replace them. If they protrude outward, however, they may be restored to their proper position by the pressure of the hand. An application of hot salt water will remove much of the fever and soreness.

FRACTURE OF THE RIBS.

The ribs are sometimes broken by severe falls upon the side, or against some hard, upright object, as a post or rock. These cases are rare, however, and are never discovered, perhaps, unless accompanied by vertebral fracture. A few cases are recorded by English veterinarians. Nothing can be done for them, except to give the horse rest, when, if not injured internally, he may get well. If the locality of the fracture can be discovered, the parts should be well bathed with hot salt water, having a strong infusion of golden seal.

SIMPLE FRACTURE OF THE LIMBS.

The legs are occasionally broken, either in consequence of a blow or a fall, or from the horse getting them hung in some fast place. It matters not so much to know what caused the fracture, as it does to understand what to do for it, and how to do it. A broken leg is a serious affair, and needs immediate attention; while an accurate knowledge of the course proper to be pursued is indispensable. The lack of such knowledge, on the part of the farmers of our country, nearly always consigns the horse to death at once, without a single effort having been made to save him. This sad state of affairs proceeds mainly from the unfrequency of these accidents. The very large majority of Americans have never seen a horse with a broken limb, although accustomed to horses all their lives; and should this casualty befall one of their own stock, at least four-fifths of them would give up the case in utter discouragement, and suffer the animal to be killed forthwith. It is a great mistake to suppose that nothing can be done for such a horse. If the proper measures are adopted promptly, he may, generally, be saved. They involve considerable labor, it is true, and draw somewhat on the farmer's time and patience; yet this is a much greater bugbear with most than there is any reason for; and even were the trouble as much as is imagined, we know of no more profitable way of spending the same amount of time.

In simple fracture of the leg there is but one bone broken, and there is no displacement. The horse is, commonly, able to walk about, but is terribly lame, of course. The treatment of such a case is not difficult. The leg should be bandaged with strong strips of starched cloth. Pads of cotton should be laid upon the leg, at the point of fracture, and the bandages wound over them. In most instances of simple fracture, the horse does not, at first, get down at all, but remains standing upon his three feet for several days. Ultimately he becomes so wearied, however, that he will lie

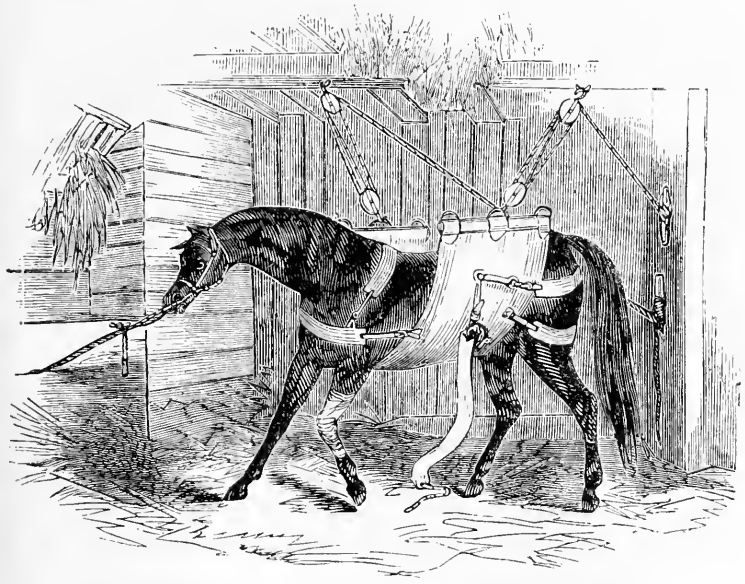
down, if he can. This is never to be permitted, but the owner should, as soon as possible after the accident is discovered, make arrangements to furnish him support, or he may lie down upon the fractured limb and break it worse than before. The salt and water, made strong with the golden seal, and as hot as he can bear it, should be applied to the entire limb, from the body to the foot, wetting the bandages thoroughly. This should be done four or five times a day, during the first four or five days, and then gradually slackened, until it is not used at all. The bandages must be taken off and re-applied, every other day; and if the wound appears to swell, and the horse shows signs of pain, (which will be indicated by his restlessness,) the bandages should remain only a few hours, and then be loosened; and when the bandage is off, let the hot bathing be well applied.

In the case of compound fractures, the horse will generally get down on his side, and must be raised to his feet. It will take some time to make the necessary preparations for this, and they will be attended with some little trouble and expense.

As this is the first and most important step, a clear description of the different arrangements for raising the horse will be necessary. The first and best is the Sling. This may be used in either simple or compound fracture. If the horse is still on his feet, and near the stable, he may be led into it, and a couple of very stong hooks put into the beam above, or into the sides of his stall, if strong enough, and the sling suspended to those on either side.

The cut on next page conveys a good idea of a sling complete in all its parts; but one of simpler construction will answer the purpose when one so elaborate can not be had. It may be made of either bagging or sail cloth. Four yards of the cloth will be sufficient. Sew the ends of the cloth together very strongly. This, when doubled, will be about six feet in length. Two round sticks of very hard, strong wood to put through the cloth; to these attach strong ropes, fastened to each end of the sticks, so that they will each

have a rope extending from one end to the other. Each rope should be about six feet in the loop between the ends of the stick, and so tied that it can not slide either way. Let the sling thus arranged be put under the horse, and then another rope be carried through the one attached to the ends of the stick, and through a ring on the hook at the sides of the stable; let the rope be carried around twice, and first drawn up and fastened on one side, and then on the other,



HORSE WITH FRACTURED LEG.

until it raises the horse's body about two inches, and yet so that he can stand on his feet. He will very soon learn to rest his body on the sling when his fore-leg becomes very tired. He must be hitched to the front by a good, strong halter, so that he can not pull back, and throw himself out of the sling. He can not have room to do so forward for the manger. If it is his fore-leg that is fractured, he will try to throw himself backward; but if the hind one, he will

incline forward. In either case he must be prevented. It may be that such an accident may occur at some distance from the stable, in which case resort must be had to the

FRAME.

A kind of gallows may be constructed very readily by locking rails or poles together, after the manner of fixing a quick gallows upon which to hang slaughtered hogs, with which every farmer is well acquainted. It will take eight poles and four chains. These must be so arranged as to stand on both sides of the horse, and in each of these couples large heavy poles should be laid, which should be about fourteen feet long, and elevated about eight feet above the ground. When this frame is ready, which can be erected in some two or three hours, the assistance of five or six men will be required to raise the horse.

Now let the sling be brought, prepared as already described, and be placed under the horse's body, and the ropes carried over the poles, which should be about six feet apart, and so braced with other poles, lashed across the ends, that they can not be drawn together. Let one man stand at his head and another at his tail, and at least two on each side, to lift, and one at the end of each rope to hold all that is gained. It will require heavy lifting to raise him, and strong efforts on the part of the men at his head and tail to keep him from pitching. When he is raised part way up, and can begin to use his feet, he will try to raise himself, and a strong pull at the rope will quite easily bring him to a standing position. He will, in all probability, be a little restive for a time, and try to get away from his fastenings, but must be held and made fast by a strong halter in front, and a bar firmly fixed behind. A roof must be made to protect him from the weather, and a stand fixed in front, with a box on it for him to feed in. Ditches should be dug around to carry the water away from his place of standing, and keep it dry.

Another arrangement can be made when the frame and

sling can not easily be procured and made. It is what we shall call the

PEN. (See Colt Founder.)

When all these arrangements are completed, we are now ready for the operation of

SETTING THE BONES.

When the fracture is a compound one, and the bones are displaced, the setting should take place before he is raised to his feet. The leg should be wet for some time previous in hot, soapy water. Cloths applied in the hot water may be wrapped around the wound, and the water then turned on for twenty minutes. A rope must be fastened to his foot and carried around a post or some fast body, and the leg gradually pulled until the bones come in place again. This can be told by a gentle pressure of the hand. The wet cloths should now be removed, and if the bones are all right, the leg may be rubbed with the hand until it is dry. This may be done by one person while the others are preparing the bandages. These should be strips of strong cloth three inches wide, and dipped in a warm adhesive mixture, made by melting equal parts of burgundy pitch, beeswax, and tallow. Begin to wind the strips some distance below the fracture, letting the end turn up the leg four or five inches, and then wind over this with the bandage to hold the end fast. Place some cotton padding over the fracture, and wind the bandage tightly over this. Let the strips lap about an inch in each winding, and extend as far above the fracture as below. If the fracture is a very bad one, splints of green wood, bent to suit the shape of the leg, and so as not to press heavily upon the wound, may be bound on with some more of the adhesive bandages. Two pieces of soft wood, of considerable thickness, may be hollowed out so as not to press upon the wound, and the ends shaved down thin to fit the leg, and then wound with the adhesive strips. All this should be done as soon as possible, and the leg relieved from the ropes.

TREATMENT OF THE WOUND.

The leg should be bathed with the hot golden seal and salt and water mixture, every few hours, during the first two or three days, and occasionally afterward.

If the fracture is above the knee or hock-joint, or if both bones are broken below either of these joints, we should advise, if the situation of the horse can be made at all pleasant, to let him remain on his side for two weeks. The frame may be erected to raise him; and, by all means, a shelter should be made over him to keep off the sun and rain. But it may be dangerous to raise the horse with a badly broken leg; and then it can not be set as well while standing as when he is on his side. If, in his lying position, the broken leg is the upper one, not much need be done to fix a support. Some bundles of straw may be laid so that the foot can rest upon them. If it is the under leg, the ground should be hollowed out under the fracture, and some straw placed under the wounded part for it to rest upon. Examinations should be made to ascertain if the leg is swelling so as not to make the bandages too tight. If too tight, they must be loosened. This should be done only in extreme cases, and will readily be discovered by the indications of suffering that the patient exhibits. If proper attention has been paid to bathing his leg, this will not be necessary. If the accident should happen in the winter, by all means get the horse into the barn or stable. His fractured leg may be temporarily bandaged and splinted, and then the animal gently moved on to a low sled, and thus drawn into the barn or stable, where he will be warm and comfortable. If he is still on his feet, he may be led into his stall, and all the operations of setting and after attentions be better paid him here than anywhere else.

If the bones are not displaced, and the leg is not bent, the simple adhesive bandage is all that will be needed. In cases of this kind, the bandages may be taken off on the third day, and re-dipped in the adhesive mixture and bound on again.

Attention should also be given to his feed. He will want

something to eat, of course, and if he is lying down he will require some assistance to hold his head up. His usual feed may be given him—chopped feed, hay, or oats, but not any corn. A bran-mash occasionally would be excellent.

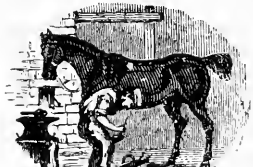
THE TIME TO HEAL.

This will vary in different cases, and be influenced much by the previous condition of the horse. If he is in low condition and feverish, he will most probably die. The fever in the system will settle in the wound and produce death. If in good health at the time of the accident, the time of his recovery will be in proportion to the badness of the fracture. If the bone of either leg be broken above the knee or hock-joint it will take a month longer for it to heal than if below; and a compound fracture, where the bone is broken entirely off and displaced, will require three times the length of time to heal as simple fracture. It will take from one to three months for either case to heal, and sometimes longer before the horse is able to go to work. He will use his limb just as soon as he is able to do so, and he is the best judge of his ability to use it.

CHAPTER XXII.

SHOEING.

The horse was subject to a sad necessity when shoes were first put on his feet, which was probably not done previous to the twelfth or thirteenth century. Before this he had no protection for his feet, as he needed none, except that which the all-wise Creator had given—the hard, horny hoof. This, in a natural age of the world, answered every purpose; but now, in this artificial age of unyielding, flinty roads, an artificial protection seems indispensable.



Perhaps no greater curse has ever been inflicted upon the horse than this of shoeing. His feet are injured—often ruined—by it. Moreover, it frequently causes diseases which ruin not only the foot, but other and more vital parts. But although the evils of shoeing are many, and the sufferings of the horse often great in consequence, the world's advantage obviously requires this submission of the brute to the use of man. Horses, if used at all on our present roads, must be shod. All that we hope to do, in writing on this subject, is to prevent, as far as possible, the unnecessary infliction of these evils upon the horse, by pointing out wherein they exist, and recommending a better practice than is usual in the art of shoeing.

The subject, horse-shoeing, has been discussed for ages, and hundreds have been the inventions for the improvement of the shoe; yet but little progress has been made, and the subject is scarcely better understood than it was a century ago. But, indeed, the prevalent evils in the practice of

shoeing arise not so much from want of knowledge, as from carelessness and indifference on the part of workmen. In a work like this, a few practical suggestions as to the best mode of preparing the foot and putting on the shoe may not be out of place. We shall introduce the subject by a quotation from Youatt, as we could give nothing better, and our views would necessarily run somewhat in the same channel, but shall afterward give such practical directions as are adapted to our own country and the conditions and requirements of the horse with us.

"The period when the shoe began to be nailed to the foot of the horse is uncertain. William the Conqueror introduced the custom into our country.

"We have seen, in the progress of our inquiry, that while it affords the foot of the horse that defense, which seems now to be necessary, against the destructive effects of our artificial and flinty roads, it has entailed upon the animal some evils. It has limited or destroyed the beautiful expansibility of the lower part of the foot; it has led to contraction, although that contraction has not always been accompanied by lameness. In the most careful fixing of the best shoe, and in the careless manufacture and setting on of the bad one, irreparable injury has occasionally been done to the horse.

"We will first attend to the preparation of the foot for the shoe, for more than is generally imagined of its comfort to the horse and its safety to the rider depends on this. If the master would generally accompany the horse to the forge, more expense to himself and punishment to the horse would be spared than, perhaps, he would think possible—provided he will take the pains to understand the matter himself; otherwise, he had better not interfere.

"The old shoe must first be taken off. We have something to observe even here. The shoe was retained on the foot by the ends of the nails being twisted off, turned down, and clenched. These clenches should be first raised—which the smith seldom takes the trouble thoroughly to do; but,

after looking carelessly round the crust, and loosening one or two of the clenches, he takes hold first of one heel of the shoe and then of the other, and by a violent wrench, separates them from the foot; then, by means of a third wrench, applied to the middle of the shoe, he tears it off. By these means he must enlarge every nail-hole, and weaken the future steady hold of the shoe, and sometimes tear off pieces of the crust and otherwise injure the foot. The horse generally shows by his flinching that he suffers from the violence with which this preliminary operation too often is performed. The clenches should always be raised or filed off; and where the foot is tender, or the horse is to be examined for lameness, each nail should partly be punched out. According to the common system of procedure, many a stub is left in the crust—the source of future annoyance.

"The shoe having been removed, the smith proceeds to rasp the edges of the crust. Let not the bystander object to the apparent violence which he uses, or fear that the foot will suffer. It is the only means that he has to detect whether any stubs remain in the nail-holes, and it is the most convenient method of removing that portion of the crust into which dust and gravel have insinuated themselves.

"Next comes the important process of paring out, with regard to which it is almost impossible to lay down any specific rules. This, however, is undoubted, that far more injury has been done by the neglect of paring than by carrying it to too great an extent. The art of paring is a work of much more labor than the proprietor of a horse often imagines. The smith, except he is overlooked, will frequently give himself as little trouble about it as he can; and that portion of the horn which, in the unshod foot, would be worn away by contact with the ground, is suffered to accumulate month after month, until the elasticity of the sole is destroyed, and it can no longer descend; and its other functions are impeded, and foundation is laid for corn and contraction, and navicular disease and inflammation. That portion of the horn should be left on the foot, which will

defend the internal parts from being bruised, and yet suffer the external sole to descend. How is this to be ascertained? The strong pressure of the thumb of the smith will be the best guide. The butteris, that most destructive of all instruments, being, except on very particular occasions, banished from every respectable forge, the smith sets to work with his drawing-knife, and removes the growth of horn, until the sole will yield, although in the slightest possible degree, to the strong pressure of the thumbs. The proper thickness of horn will then remain.

"If the foot has been previously neglected, and the horn is become very hard, the owner must not object if the smith resorts to other means to soften it a little, and takes one of his flat irons, and, having heated it, draws it over the sole, and keeps it a little while in contact with the foot. When the sole is really thick, this rude and apparently barbarous method can do no harm; but it should never be permitted with the sole that is regularly pared out. The quantity of horn to be removed, in order to leave the proper degree of thickness, will vary with different feet. From the strong foot a great deal must be taken; from the concave foot the horn may be removed, until the sole will yield to a moderate pressure; from the flat foot little needs to be pared; while the pummiced foot should be deprived of nothing but the ragged parts.

"The paring being nearly completed, the knife and the rasp of the smith must be a little watched, or he will reduce the crust to a level with the sole, and thus endanger the bruising of it by its pressure on the edge of the seating. The crust should be reduced to a perfect level all around, but left a little higher than the sole.

"The heels will require considerable attention. From the stress which is thrown on the inner heel, and from the weakness of the quarter there, the horn usually wears away considerably faster than it would on the outer one; and if an equal portion of horn were pared from it, it would be left lower than the outer heel. The smith should, therefore,

accommodate his paring to the comparative wear o. the heels, and be exceedingly careful to leave them precisely level.

"If the reader will recollect what has been said of the intention and action of the bars, he will readily perceive that the smith should be checked in his almost universal fondness for opening the heels, or, more truly, removing that which is the main impediment to contraction. The portion of the heels between the inflexion of the bar and the frog should scarcely be touched—at least the ragged and detached parts alone should be cut away. The foot may not look so fair and open, but it will last longer without contraction.

"The bar, likewise, should be left fully prominent, not only at its first inflexion, but as it runs down the side of the frog. The heel of the shoe is designed to rest partly on the heel of the foot and partly on the bar, for reasons that have already been stated. If the bar is weak, the growth of it should be encouraged; and it should be scarcely touched when the horse is shod, unless it has attained a level with the crust. The reader will recollect the observation which has already been made, that the destruction of the bars not only leads to contraction by removing the grand impediment to it, but by adding a still more powerful cause in the slanting direction which is given to the bearing of the heels when the bar does not contribute to the support of the weight.

"It will also be apparent that the horn between the crust and the bar should be carefully pared out. Every horseman has observed the relief which is given to the animal lame with corns when this angle is well thinned. This relief, however, is often but temporary, for when the horn grows again, and the shoe presses upon it, the torture of the horse is renewed.

"The degree of paring to which the frog must be subjected will depend on its prominence and on the shape of the foot. The principle has already been stated that it must be left so far projecting and prominent that it shall be just within and above the lower surface of the shoe; it will then descend

with the sole sufficiently to discharge the functions that have been attributed to it. If it is lower, it will be bruised and injured; if it is higher, it can not come in contact with the ground, and thus be enabled to do its duty. The ragged parts must be removed, and especially those occasioned by thrush, but the degree of paring must depend entirely on the principle just stated.

"It appears, then, that the office of the smith requires some skill and judgment, in order to be properly discharged; and the proprietor of horses will find it to his interest to occasionally visit the forge, and complain of the careless, or idle, or obstinate fellow, while he rewards, by some trifling gratuity, the expert and diligent workman. He should likewise remember that a great deal more depends on the paring out of the foot than on the construction of the shoe; that few shoes, except they press upon the sole or are made outrageously bad, will lame the horse; but that he may be very easily lamed from ignorant and improper paring out of the foot.

THE PUTTING ON THE SHOE.

"The foot being thus prepared, the smith looks about for a shoe. He should select one that as nearly fits the foot as possible, or may be easily altered to the foot. He will sometimes, and especially if he is an idle, reckless fellow, care very little about this, for he can easily alter the foot to the shoe. The toe-knife is a very convenient instrument for him, and plenty of horn can be struck off with it, or removed by the rasp, in order to make the foot as small as the shoe; while he cares little, although by this destructive method the crust is materially thinned where it should receive the nail, and the danger of puncture and of pressure upon the sole is increased; and a foot so artificially diminished in size will soon grow over the shoe, to the hazard of considerable or permanent lameness.

"While the horse is traveling, dirt and gravel are apt to insinuate themselves between the web of the foot and the sole. If the shoe were flat, they would be permanently re-

tained there, and would bruise the sole and be productive of injury; but when the shoe is properly beveled off, it is scarcely possible for them to remain. They must be shaken out almost every time that the foot comes in contact with the ground.

"The web of the shoe is likewise of that thickness that when the foot is properly pared, the prominent part of the frog shall lie just within and above its ground surface, so that in the descent of the sole the frog shall come sufficiently on the ground to enable it to act as a wedge, and so expand the quarters, while it is defended from the wear and injury it would receive if it come on the ground with the first and full shock of the weight.

"The nail-holes are, on the ground side, placed so near the outer edge of the shoe as they can safely be, and brought out near the inner edge of the seating. The nails thus take the direction inward, resembling that of the crust itself, and have firmer hold, while the strain upon them in the common shoe is altogether prevented; and the weight of the horse being thrown on a flat surface, contraction is not so likely to be produced.

"The smith sometimes objects to the use of this shoe on account of its not being so easily formed as one composed of a bar of iron, either flat or a little beveled. It likewise occupies more time in forging; but these objections would vanish when the owner of the horse declared that he would have him shod elsewhere, or when he consented—as in justice he should—to pay somewhat more for a shoe that required better workmanship and a longer time in construction.

"It is expedient not only that the foot and ground surface of the shoe should be most accurately level, but that the crust should be exactly smoothed and fitted to the shoe. Much skill and time are necessary to do this perfectly with the drawing-knife. The smith has adopted a method of more quickly and more accurately adapting the shoe to the foot. He pares the crust as level as he can, and then he brings the shoe to a heat, somewhat below a red heat, and applies it to

the foot, and detects any little elevations by the deep color of the burned horn. This practice has been much inveighed against, but it is the abuse and not the use of the thing which is to be condemned. If the shoe is not too hot, nor held too long on the foot, an accuracy of adjustment is thus obtained which the knife would be long in producing, or would not produce at all. If, however, the shoe is made to burn its way to its seat, with little or no previous preparation of the foot, the heat must be injurious both to the sensible and insensible parts of the foot.

"The heels of the shoe should be examined as to their proper width. Whatever is the custom of shoeing the horses of dealers, and the too prevalent practice in the metropolis of giving the foot an open appearance, although the posterior part of it is thereby exposed to injury, nothing is more certain than that, in the horse destined for road-work, the heels, and particularly the seat of corns, can scarcely be too well covered. Part of the shoe projecting externally can be of no possible good, but will prove an occasional source of mischief, and especially in a heavy country. A shoe the web of which projects inward so far as it can without touching the frog, affords protection to the angle between the bars and crust.

"Of the manner of attaching the shoe to the foot the owner can scarcely be a competent judge; he can only take care that the shoe itself shall not be heavier than the work requires; that for work a little hard the shoe shall still be light, with a bit of steel welded into the toe; that the nails shall be as small and as few and as far from the heels as may be consistent with the security of the shoe; and that for light work, at least, the shoe shall not be driven on so closely and firmly as is often done, nor the points of the nails be brought out so high up as is generally practiced.

CALKINS.

"There are few cases in which the use of calkins (a turning up or elevation of the heel) can be admissible in the fore-feet, except in frosty weather, when it may, in some degree, pre-

vent unpleasant or dangerous slipping. If, however, calkins are used, they should be placed on both sides. If the outer heel only is raised with the calkin, as is too often the case, the weight can not be thrown evenly on the foot, and undue straining and injury of some part of the foot or leg must be the necessary consequence. Few things deserve more the attention of the horseman than this most absurd and injurious of all the practices of the forge. One quarter of an hour's walking, with one side of the shoe or boot raised considerably above the other, will painfully convince us of what the horse must suffer from this too common method of shoeing. It can not be excused even in the hunting shoe. If the horse is ridden far to cover, or galloped over hard and flinty ground, he will inevitably suffer from this unequal distribution of the weight. If the calkin is put on the outer heel, in order to prevent the horse from slipping, either the horn of that heel should be lowered to a corresponding degree, or the other heel of the shoe should be raised to the same level by a gradual thickening. Of the use of the calkins in the hinder foot we shall presently speak.

CLIPS.

"These are portions of the upper edge of the shoe hammered out and turned up so as to embrace the lower part of the crust, and which is usually pared out a little in order to receive the clip. They are very useful, as more securely attaching the shoe to the foot, and relieving the crust from that stress upon the nails which would otherwise be injurious. A clip at the toe is almost necessary in every draught horse, and absolutely so in the horse of heavy draught, in order to prevent the shoe from being loosened or torn off by the pressure which is thrown upon the toe in the act of standing. A clip on the outside of each shoe, at the beginning of the quarters, will give security to it. Clips are likewise necessary on the shoes of all heavy horses, and of all others who are disposed to stamp or violently paw with their feet, and thus incur the danger of displacing the shoe; but

they are evils, inasmuch as they press upon the crust as it grows down, and they should only be used when circumstances absolutely require them. In the hunter's shoe they are not required at the sides. One at the toe is sufficient.

THE HINDER SHOE.

"In forming the hinder shoes, it should be remembered that the hind limbs are the principal instruments in progression, and that in every act of progression, except the walk, the toe is the point on which the whole frame of the animal turns, and from which it is propelled. This part, then, should be strengthened as much as possible, and, therefore, the hinder shoes are made broader at the toe than the fore ones. Another good effect is produced by this, that the hinder foot being shortened, there is less danger of overreaching or forging, and especially if the shoe is wider on the foot surface than on the ground one. The shoe is thus made to slope inward, and is a little within the toe of the crust.

The shape of the hinder foot is somewhat different from that of the fore-foot. It is straighter in the quarter, and the shoe must have the same form. For carriage and draught horses, generally, calkins may be put on the heels, because the animal will thus be enabled to dig his toe more firmly into the ground and urge himself forward, and throw his weight into the collar with greater advantage; but the calkins must not be too high, and they must be of an equal height on each heel; otherwise, as has been stated with regard to the fore-feet, the weight will not be fairly distributed over the foot, and some part of the foot will materially suffer. The nails in the hinder shoe may be placed nearer to the heel than in the fore shoe, because, from the comparatively little weight and concussion thrown on the hinder feet, there is not so much danger of contraction.

DIFFERENT KINDS OF SHOES.

The following cut represents the proper form of shoe for the off fore-foot, showing both the upper and under surfaces:

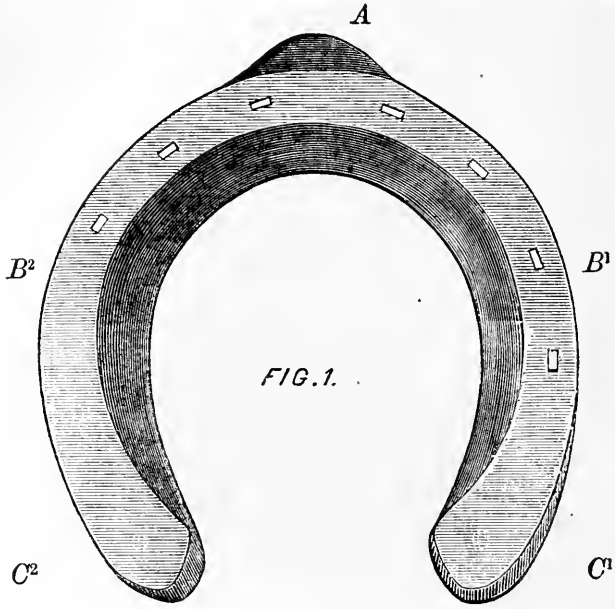


FIG. 1.

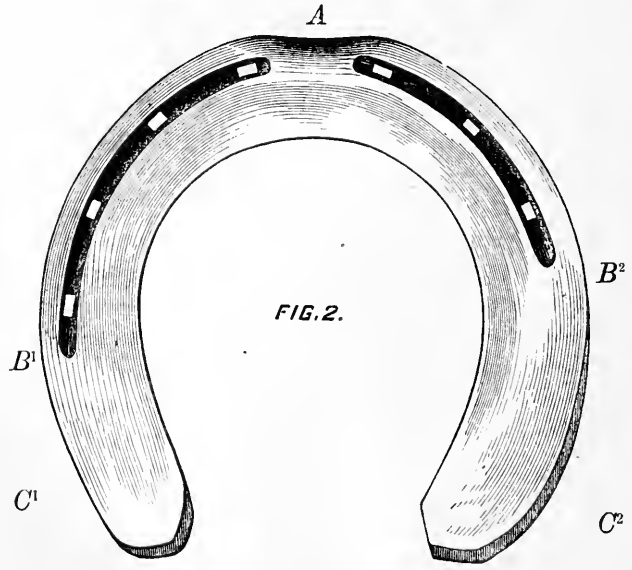


FIG. 2.

CONCAVE SEATED ENGLISH SHOE FOR OFF FORE-FOOT, SHOWING BOTH SURFACES

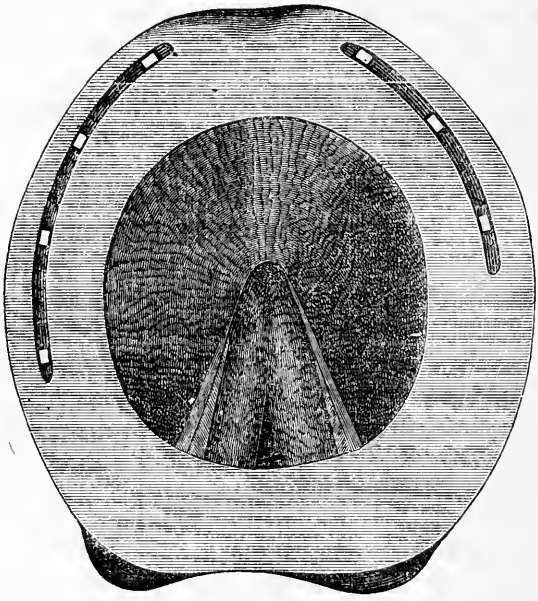
In Fig. 1, *A* is the clip at the toe; B^1, the outer quarter; B^2, the inner quarter; C^1, the outer heel; C^2, the inner heel. The dark shade represents the concave surface to lighten the shoe and keep off pressure from the sole; and the lighter shading the flat surface for the crust of the hoof to bear upon.

In Fig. 2, *A* is the toe turned up out of the line of wear; B^1, the outer, and B^2, the inner quarter; C^1, the outer, and C^2, the inner heel; the light shade representing the ground surface of the web, as wide at the heels as it is at the toe; the dark line representing the fuller carried back no further than is required by the nails, so that the shoe may not be weakened unnecessarily.

This should never be made wider at the heels than the foot it is intended for, but should curve inward exactly to correspond on the internal surface with the crust of the hoof. The inner half should be forged of concave shape, making the inner edge much thinner than the outer, so as to keep all pressure off the sole of the foot, and prevent pieces of gravel, which get under the shoe, from doing injury to the foot. The web of the shoe for an ordinary sized horse should be about an inch wide, but varying to the conformation of the foot and use of the horse—always narrower, however, at the heel than at the quarter. The shoe should be attached by a few nails and near the toe. Three holes on the inside toe and four on the outside quarter, as shown in the cut, are usually sufficient to secure the shoe; and for light horses, one or two can be dispensed with if the shoe is not too long at the heel and allowed to overlap it. The toe of the shoe should be turned up in a clip, but not enough to interfere with the nail-holes there. Of course calks should be added when the roads are slippery, and they should be of uniform height at heel and toe. The one at the toe should be made of steel and welded into the shoe.

The following cut represents the bar shoe, of which Walsh says in his highly scientific work: "It is never used in this country (England) for sound feet, but it is a great pity that some modification of it can not be introduced, so as to obviate all the objections which apply to the ordinary shoe. It consists of a complete ring of iron, similar in shape to the ordinary shoe, so far as the back of the quarters, but

from that part bending inward to meet the web of the opposite side with which it is welded.



BAR SHOE FOR OFF FORE-FOOT—FITTED, BUT NOT NAILED ON.

"It is now used for the purposes exactly the reverse of each other. In the one case, the foot is so prepared that the frog shall touch the shoe, while the heels are quite free, and are, thereby, relieved from all pressure. In the other, the frog does not come in contact with the shoe, which is solely supported by the crust and the bars. It may thus be made to defend either the frog or the heels, whichever may be in fault, and it is one of the most invaluable aids to veterinary surgery. Should the frog be more prominent than the crust, the shoe may be made thin in proportion, at the part where it covers the former, and by this means it may be made exactly to fit the two when it is desired to divide the weight between them. There are many weak-heeled harness horses which would do their work much better if they were per-

manently shod in this way, and but for the danger of pulling these shoes off, and the little hold which they take of the ground, hacks might also sometimes be shod advantageously with the bar shoe. It is unsightly, certainly, and at present marks the existence of some disorder, and for these reasons it is now seldom employed, except on compulsion."

We will now conclude our extract from Youatt, and then proceed with our own comments.

"The shoe must vary in substance and weight with the kind of foot and the nature of the work. A weak foot should never wear a heavy shoe, nor any foot a shoe that will last longer than a month. Here, perhaps, we may be permitted to caution the horse proprietor against having his cattle shod by contract, unless he binds down his farrier or veterinary surgeon to remove the shoes once at least in every month; for if the contractor, by a heavy shoe and a little steel, can cause five or six weeks to intervene between the shoeings he will do so, although the feet of the horse must necessarily suffer. The shoe should never be heavier than the work requires, for an ounce or two in the weight of the shoe will sadly tell at the end of a hard day's work. This is acknowleged in the hunting shoe, which is narrower and lighter than that of the hackney, although the foot of the hackney is smaller than that of the hunter. It is more decidedly acknowledged in the racer, who wears a shoe only sufficiently thick to prevent it from bending when it is used."

The above directions are applicable to any country, and can not be well improved upon in the main, but we must differ in some respects with their author, as will hereafter appear. Smiths are generally more careful, and understand their business better in this country than is above represented. There has been a commendable spirit of improvement among our smiths of late years in the art of good shoeing. Some of them make mistakes, but not oftener than is common in other departments of business. Some do not understand their business, but of these there are not many.

To shoe a horse well is a very nice operation. There is

much care to be used in observing the quality of different feet or hoofs. Every horse that comes to the shop has a foot of peculiar texture and shape. The shoe should be adapted to these varying qualities, and also to the size, weight, habit, etc., of the horse. The *size* of the horse must be taken into special consideration—small, light animals by no means requiring the thick and heavy shoes suited to the large draught horse.

A hard, flinty hoof does not require so wide a shoe as a soft, pumiced one. It is a fault prevalent among smiths of leaving too much space between the nails in the front part or toe of the shoe. Shoes stay on much better when the space here is small, as this is the strongest part of the hoof.

Winter shoes may have calks, but summer shoes should not. The summer shoe should have a large groove for the nails to imbed their heads in, and the heel of the shoe may be made somewhat thicker, so as to rest upon the ground when the foot is elevated by the nails. Horses that have tender or sore feet from the effect of corns or hoof-rot, or both, or whose hoofs are worn down on turnpike roads, should have a strip of felt cut in the shape of the shoe and laid under it before nailing. This will greatly relieve the pressure of the shoe.

PARING THE HOOFS.

The usual fault in paring is in taking off too much at the heel and not enough at the toe, thus throwing the foot too far back and causing a dangerous strain upon the coffin joint; and from this bad practice ring-bone, foot-evil, and navicular disease often arise. As a rule, one-third more should be pared off from the toe than from the heel, as the pressure of the shoe wears the heel much faster than the toe. We must differ somewhat from the high authority of our English author in relation to paring the frog. It should be pared at least a third of an inch lower than the sides of the foot. The bars which hold it to the sides of the heel should not be cut. The shuttle-bone lies immediately upon the frog,

and when the latter is allowed to grow down so as to rest upon the ground an injurious pressure is brought to bear upon this bone, and its connection with the other bones and the large flexor tendon of the joint. From this cause serious diseases have arisen, baffling the skill of the best veterinary physicians to detect and remedy.

CHANGING THE SHOES.

The great fault in all this matter of shoeing is one for which the farmer is chiefly to blame; namely, neglect to change the shoes. This neglect more seriously affects young horses than older ones, as the feet of the former grow faster, and are more soft and tender; but any horse's hoof soon grows too large for the shoe, and after a time extends so much that the nails of the shoe begin to draw the hoof together, and from this cause arises a majority of cases of contraction of the hoof, or narrow heel. Besides, the water so constantly between the shoe and the hoof causes the shoe to rust, and the action of the iron-rust, thus confined, is very destructive to the hoof, and produces a species of decay known as the hoof-rot and pumiced feet, already described in this chapter.

THE TIME OF WEARING.

The length of time that shoes may be worn without injury varies with different horses. Horses with soft or pumiced feet should not wear them longer than forty or forty-five days; those of six or seven years of age, when their feet are good, may wear them for sixty or seventy days; and old horses, if their feet have never been injured, may keep them on for three months—the extreme length of time in any case. Young horses with their first shoes should not wear them longer than forty days.

The injuries incurred by wearing the shoes before the feet have become fully formed, or have attained their full size and hardness, are many. Colts should have on shoes but a little part of the year. Nor should the colt be shod at all until he is at least three years old, and even this is earlier

than is advisable. Shoes may be put on the three years' colt at the beginning of winter, and remain until spring, when they are to be removed and left off until the following autumn.

All horses, and especially all young horses, should spend as much of their time bare-footed as possible. The shoes should be taken from the farm-horse in the spring, his feet pared, and the edges of the hoof trimmed; and if the bottoms have begun to decay they should be wetted with turpentine, which must be thoroughly dried in by holding a hot iron under the bottom of the hoof as long as the horse will bear the heat. The corrosive liniment may be used instead of turpentine. This will preserve the hoof from the evil effects of shoeing, and destroy any tendency to disease. Feet that have long been shod will always be tender, and they are often injured when the shoes are removed, and afterward much hurt by contact with the hard ground. Moreover, when shoes are not properly trimmed, the hoofs break in such a manner as to let the bottom of the foot down upon the ground, and the horse is given pain by every step he takes, from the soreness of the soles of the hoof.

The corrosive liniment, used as directed in the chapter on medicines, will readily heal and harden the hoof. Indeed, this invaluable liniment might well be applied to the hoof on many occasions, and thus certainly prevent such diseases as hoof-rot, corns, grease, and thrush.

CHAPTER XXIII.

VICES AND UNSOUNDNESS OF THE HORSE.

I. VICES.

The horse, like man, his master, is a compound of defects and excellent qualities. Confessedly among the noblest, if not the noblest, of the lower animals, he yet has his full share of vices. Most of these are common to the species, though a few seem to belong exclusively to particular breeds. They are sometimes traceable to natural disposition, but more frequently to the result of improper training, of neglect or abuse. False education, in the horse as well as the human creature, is necessarily a cause of untold evil. The horse seems readily to fall into bad ways, and should be curbed, controlled, and directed properly from the very first. The value of a horse is, of course, diminished in proportion to the number of his "vices," and purchasers are often cheated through ignorance of the means of detecting them. Many persons are deceived by an opinion that prevails largely in the country that a horse can easily be cured of a bad habit. This is a great mistake. It is hard to teach an old dog new tricks, but still harder to break an old horse of bad tricks. It is, indeed, so difficult as to be very rarely accomplished. The colt age is the time for training; and if it is not done then it is almost worse than useless to try to do it afterward, Rarey to the contrary notwithstanding.

We will now proceed to take up and consider in order some of the chief "Vices of the Horse."

KICKING.

Kicking is probably the worst habit that the horse is ever addicted to, for it is very dangerous. It may be induced in

the colt by pinching, teasing, and otherwise annoying, as boys and hostlers often do. The grown horse is not likely to kick, unless this habit has been acquired early. Still, there are colts that seem naturally vicious in this particular. They will kick, when very young, at every body and every thing that comes near them. But by far the larger number, as above intimated, acquire the habit through the ignorance or carelessness of attendants. From very small beginnings grow the very worst evils. A habit of kicking once acquired will increase, until it becomes quite unsafe to approach the animal addicted to it. All can remember the startling warning, so often heard, "Take care—that horse may kick you!" It is perilous to enter the stall of a kicking horse, or to attempt to clean him, or to hitch him, or even touch him with harness. Some horses will kick at other horses, but not at persons; some at chains rattling about them, but not at other parts of the harness. Some will permit one person to ride them, but decidedly object to two, and will kick violently if two attempt to mount them. The most dangerous of all kicking is that done in harness. Says Youatt, "From the least annoyance about the rump or quarters, some horses will kick at a most violent rate, and destroy the bottom of the chaise and endanger the limbs of the driver. Those that are fidgety in the stable are most apt to do this. If the reins should perchance get under his tail, the violence of the kicker is most outrageous; and while the animal presses down his tail so tightly that it is almost impossible to extricate the reins, he continues to plunge until he has demolished every thing behind him."

It is not only imprudent to keep a horse addicted to such practices as above described, but it is criminal. It amounts to a species of insanity.

The best remedy for kicking is to tie a small, hard rope to the hair of the tail; pass the rope along the belly and between the legs, and fasten it very tightly to the collar, or to another rope tied round the neck. When the animal thus

fettered attempts to kick, the motion of his hind legs will bring such a strain on the rope, and hurt his tail and the skin of his belly so much, that he will be deterred from an exercise that costs him so dearly.

BITING.

This vicious habit generally arises from a natural disposition to ferocity, but is made worse by the meanness of boys and stable attendants. Few horses would ever become biters were it not for the annoyances to which they have been subject, and some horses can scarcely be induced to bite. Biting horses are very vexing, and often dangerous. It is impossible to enter their stall with safety, or to curry, saddle, harness, or even feed them without fear of mischief. The biter's worst fault is, that he gives no warning of his intention. He appears as docile and quiet as usual, but as soon as the incautious person approaches within his reach, he seizes him with his teeth, often inflicting serious injury.

A biting stallion is an exceedingly dangerous animal; he not only bites, but is apt to strike with his fore-feet. A gentleman in Middle Tennessee, who owned a very valuable stallion that was in the habit of biting, went to the stable, one evening, to feed him, but as he did not return, his family, going to look for him, found him dead under the horse's feet.

There is no cure for this propensity, except to knock out one of the front teeth of the vicious animal every time he bites a person. This is a dreadful remedy, but it is better than to be continually in danger. It is an effectual remedy. Few horses will need to have more than two teeth removed—one above and one below.

Professor Stewart, in his "Stable Economy," pronounces the worst form of biting to be a "species of insanity."

The habit of biting can be remedied or prevented in the colt, and it is the interest and duty of every horse-owner to see that it is remedied or prevented. It is of no use to punish the colt for this or any other bad habit. Kindness will

do more good than punishment. See to it that all teasing and vexing of your colt be promptly and entirely broken up.

REARING.

This habit is often induced by bad treatment, such as jerking the mouth with the bridle, etc. Whatever may be the cause of it, it is a very troublesome and dangerous fault. By it riders are most frequently thrown, with what sad results is well known. If a horse rears in the harness, he is almost sure to fall, and get himself entangled in the gear, breaking it, oftentimes, and injuring himself. If beside another horse, this, if not hurt, is generally made scary by example. Some horses will not back without rearing. Persons purchasing horses should be sure to try them at backing.

The remedy recommended for kicking will also apply to rearing.

SCARING.

Scaring is a common defect among horses. Some of them will take fright at almost any thing, and sometimes apparently at nothing. In many cases it is occasioned by a defect of vision. Some horses are near-sighted, and, in consequence, do not see objects until they are alarmingly near. But, like the other vices we have been considering, scaring is generally a habit brought on by bad training. Inconsiderate boys and irresponsible hostlers often have a habit of frightening colts whenever they come near them. A habit of scaring contracted in colthood generally remains through life. There is no radical remedy for it. Gentle and kind treatment may effect much, and nothing else will.

Since the miserable old blind-bridles have gone out of use, there are not so many scary horses as there used to be.

A horse generally gives evidence of fright either by jumping forward or sidewise, or by shying. Jumping is the most dangerous, as it is usually the signal for running. Nor is the horse likely to delay long. He is off in an instant—either to one side, upsetting or endangering the vehicle he draws,

or straight ahead, with a force and rapidity that it strongly taxes a driver's strength to restrain. Shying is not so serious, but it is very annoying. Many horses that start, shy, and jump will not run away, but this is not generally the case.

RUNNING AWAY.

There is no trust to be put in a horse that has once run away; and a horse having run when harnessed to a vehicle ought never again to be driven to the same vehicle. Nor will it be safe, in most cases, to drive him singly, unless to the plow. He may be ridden or worked beside some old, steady horse in the wagon, but this is as far as it is safe to trust him. It is to be remembered that scaring is the natural antecedent to running away. No horse will run away that will not scare.

BALKING AND BACKING.

The habit of balking and backing is one of the worst and most insufferable that a horse is ever addicted to, and one which renders "horse-flesh" next to worthless. It is a habit we are again compelled to attribute not so much to the natural disposition of the horse as to faulty training and abuse in colt-breaking. It is often the result of overloading the young animal before he has been trained to hard pulling, and before he has become strong enough to bear the strain of drawing heavy loads. The overtaxed and weary beast, perhaps midway up a long hill, gives out from sheer exhaustion; and then the wagon runs back, pulling him with it, and in this way the practice of backing and balking is begun, and at first a necessity, becomes in time a confirmed habit.

A horse that is not broken before the age of three years is more liable to run into this practice than one broken earlier.

Of course there is no dependence to be put on a balky horse. When you most need his services, he is most likely to disappoint you. Numbers of accidents are continually

occurring from the imprudence of driving balky beasts, and yet many persons will persist in a practice fraught with imminent danger to property and life. Indeed, there is hardly any matter in which men display more foolhardiness than in their dealings with horses.

There is no cure for a balky horse. We have seen nearly all means tried, and have seen them fail, and have no confidence in any plan for breaking up the detestable habit. Many secret rules for the cure of it have been circulated in the country, the chief effect of which has been to deceive credulous persons, and to extract a few dollars from their pockets. A class of secret-rule-selling impostors may tame and control a *very lazy horse*, so that he will stand still and let you handle him, if you will scratch his itching hide and breathe into his nostrils—an operation very grateful to him—but none of them has ever succeeded in making an obstinate, old, balky horse pull up a steep hill; and, furthermore, they never will do it.

The horse can be trained from a colt to be true and steady in harness, and kept from bad tricks, and broken of some vices, but not of habitual balking.

CHEWING THE REINS.

This pernicious habit is mostly confined to young colts and mules. The old horse is but seldom guilty of it, but mules often continue it all their lives.

It may be prevented and the animal effectually cured by soaking the hitch-rein of the halter in a strong decoction of Cayenne pepper. In the absence of Cayenne pepper tobacco may be employed.

PULLING AT THE HALTER AND BREAKING AWAY.

Some horses will never stand hitched by the halter, but are always restive and pulling, and frequently break away. This is, in nearly all cases, a defect of early training—of mismanagement of the colt while quite young. Boys are apt to be continually scaring the colt, which, if tied with a

weak cord, will sometimes break away; and when once he has learned that he can do this, he will ever afterward be trying his halter, and two or three times breaking will confirm the habit. The only remedy is to provide a halter too strong to be broken.

OVERREACHING AND INTERFERING.

Overreaching and interfering are perhaps not so properly classed under the head of *vices* as under that of infirmities. The first results in consequence of the horse's having more power and nervous action in his hind than in his fore-legs. The toe of his hind foot strikes against the heel of the fore-foot, and, when the horse is shod, there is a peculiar, disagreeable sound of the iron shoes hitting together. Besides the unpleasantness of this defect to a rider or driver, a horse afflicted by it is constantly injuring himself by cutting the heel of the fore-foot, often laming himself seriously.

When the horse strikes the fore-foot on one side against the ankle of the other, in the act of stepping, he is said to interfere. Such a horse will nearly always have the inside of one or both ankle-joints cut and bleeding, and be continually halting and limping from the effects of these bruises. Horses that are very narrow in the chest, and whose legs are not very closely together, are obviously more liable to this trouble than others.

Much may be done to remedy interference by paring the hoof close and round on the inside, and keeping the shoe-nails from projecting outward; but nothing will entirely cure a bad case of interference. Plenty of good, wholesome food, to make the horse fat, will spread his legs somewhat further apart, and partially remedy the defect, which, in fact, is often an effect of leanness and hunger.

STUMBLING.

Stumbling is also rather an infirmity than a vice. It results from a natural fault in the shape of the hoof and foot, and also from a stiffness of the knee. The legs of stumbling

horses are set too straight down in the hoof, like a post in the ground. A stumbler, however, is generally an old stiff-jointed, worn-out animal, fit for nothing but the wagon or the plow. There is no cure for a stumbler, and woe to the man who attempts to ride one. He had better have his neck insured before he mounts.

II. UNSOUNDNESS.

The horse can not tell his ailment, and sometimes fine-looking animals possess defects that the best of judges fail to discern. It is our present object to point out some of the more important marks of unsoundness, to guard the reader against imposition, for jockeys are very skillful in concealing the blemishes of their horses, and buyers are often deceived and cheated.

DEFECTS OF THE EYE.

It is difficult to detect a bad eye. It can be done best in the bright sunshine. The head of the horse should be held in such a position as to let the sun's rays fall as directly as possible upon the ball of the eye. If it is not perfectly clear, the sun shining into it will reveal this. Another mode of judging of the condition of the eye is by examining the nose of the horse, and looking for the little opening in the back lining of the nostril, (described in the chapter on the eye and blind staggers,) which is the outlet of the lachrymal duct that drains the water from the eye. This little opening will be discovered to be of different sizes in different horses, varying from the size of a pin's head to an eighth or even a third of an inch in diameter. The size of this opening is directly indicative of the strength of the eye; and in all cases of disease of the eye, (except from blows or injuries,) and in all cases of blindness caused by disease, the little opening has been found to be very small; and in a majority of cases that we have examined—numbering nearly five hundred—these openings were not larger than a pin's head; and in *four*

cases of bad eyes examined by us during the past month, August, 1866, in Petersburg, Ky., the lachrymal openings were very small indeed. On the contrary, in almost every case of large, full, clear eyes, these openings are proportionably large. This is an almost unvarying rule, that the strength of the eye to resist disease, and its liability to go out, will be indicated by the size of these openings.

DEFECTS OF THE FEET.

There are more horses unsound from defects of the feet than from all other causes together. Many of these defects arise from bad shoeing, but more of them from bad stabling, which compels the horse to stand in wet and filth. Plank floors are very hurtful to horses' feet, especially in summer. The diseases most likely to attack the feet first are hoof-rot, corns, thrush, grease, scratches, and these are the exciting cause of many others. Hoof-rot is a condition of the foot that has excited but little attention, and yet it lies at the foundation of almost all the other foot difficulties. Hoof-rot, also called pumice feet, has already been described. It is indicated by a soft, rotten state of the bottom of the hoof, permitting its substance to be easily dug or cut out with a knife or a chisel. The soft matter will be thickest at the back part of the foot, and has a white, chalky, scaly appearance. When the feet are in this condition, the horse will be what is called tender-footed, a condition indicated by his peculiar manner of stepping. The joints will swell, and many troublesome, if not incurable diseases ensue. Never forget that hoof-rot is a serious disease, and, consequently, a positive and deplorable condition of unsoundness.

DEFECTS OF THE SKIN.

Many horses are afflicted by a scurviness of the skin which fills the hair with a brownish dust. Such horses can never be kept clean. You can hardly rub your hand over one of them without its becoming smeared with this gummy scurf. If you curry out all you can in the morning, it will be just

as bad again at night. This condition continues sometimes for months and years. Few persons ever think that this indicates any thing specially wrong, but they are sadly mistaken. It is caused by a disease of the skin, a continued fever which is drying up the scarf or cuticle, and thickening the hide all over the body. It may be located in the skin alone, yet often is caused by a general unhealthy state of the system. It is the beginning of other serious diseases, and is especially injurious to the eye. It is unsoundness of the most dangerous character.

DEFECTS OF THE RESPIRATORY ORGANS.

The respiratory organs are often diseased, and even when apparently sound the effects of previous disease may remain, though in a latent form, and render a horse much less valuable than he would otherwise be. Purchasers are in danger of being cheated by having a horse thus unsound imposed upon them. Some of the chronic complaints resulting from diseased respiratory organs are coughs, broken wind, wheezing, thumps, etc. These complaints can best be detected by driving or riding the animal for some distance at a rapid rate. If any thing is the matter with these organs, he will show it in his breathing. Dry, dusty feed will, in most cases, bring to light a hidden chronic cough. Examine well your horse before you buy him or trade for him.

DEFECTS OF STOMACH AND BOWELS.

Indigestion and intestinal disturbances are common to the horse, but these, or at least their more violent symptoms, soon pass away. Not so their effects; a diseased and weakened condition of the digestive organs often remains. Many horses are subject to frequent attacks of colic, the consequence of imperfect functions of weakened organs. Others are constantly troubled with looseness of the bowels. In some cases the food is voided but partially digested, portions of hay and grain passing whole. These may be but temporary affections of the bowels, but in some cases remain constant.

THE URINARY ORGANS.

The urinary organs are more subject to disease than any other parts of the horse. Inflammation of any of these organs can not last long. It must soon be cured or it will soon kill. Even when cured, it nearly always leaves evil effects in the form of stricture of some of the passages—of a constant tendency to fullness of the sheath, or of a disordered state of the urine, known under the names of thick or albuminous urine, white or briny urine, bloody urine, profuse stalling, and suppressage or stoppage of the urine. In some cases these affections are only temporary, and pass away with the disease that caused them, but in many others they become permanent.

CONCLUSION.

There are many other species of defect to which the horse is liable besides those we have mentioned. It has been our purpose only to mention such important defects as seriously impair the soundness of the horse, and are not generally understood. The reader needs no warning against defects easily to be discovered, but against those of a more hidden and intricate nature he may find a word of caution beneficial. Certain diseases have their marks so prominent that they can be detected at once; such are ring-bone, spavin, splint, wind-galls, narrow heel, swelled legs, big head, etc. These all constitute unsoundness in a greater or less degree, but are so well known that no description of them is needed.

CHAPTER XXIV

MEDICAL PREPARATIONS RECOMMENDED IN THIS WORK.

But few persons are to be found in our country capable of treating properly the diseases of the horse; but there is no lack of quacks, the presumption and ignorance of whom have thoroughly disgusted the people. Occasionally, however, we are favored by the presence of a veterinary practitioner of knowledge, skill, and experience. The cities are, in this respect, better supplied than the country; yet even in the city the old treatment and exploded theories of diseases generally prevail, and the medicines in common use are too often ineffectual. In practice it will frequently be found that medicines are applied to destroy the effects rather than to remove the causes of disease. A case in point: We have under treatment a horse in Petersburg, Kentucky, that had been doctored for the "swelled leg" by a professedly "scientific practitioner." Medicine had been applied to the leg to abate the swelling, while the *foot* was dreadfuly diseased with hoof-rot, corns, and incipient greasy heel. This condition of the foot had been the cause of the swelling of the leg, but nothing had been done for it, if it had even been discovered at all.

The farmer must necessarily, as a rule, be his own horse-doctor, or go without any. It is, therefore, very important that he and all horse-owners should make themselves acquainted not only with the ordinary diseases, but with the medicines most likely to cure them. The practice now in vogue is to use preparations unfamiliar to the farmer, and not easily procured. This ought not to be so. The essential remedies usually employed with most benefit are simple, and obtained without difficulty; nor are they dangerous to use.

The medicines described in these pages are few and familiar; yet they, singly or in combination, have been proven by experience to be efficacious. We shall briefly give their constitution, properties, mode of preparation, and use. Particular attention should be paid to the directions given for their preparation; and the manner of using here recommended should be strictly followed.

CORROSIVE LINIMENT.

I.

Take half a pint of turpentine, which put in a good, strong bottle, adding an ounce of finely-pulverized corrosive sublimate and an ounce of gum camphor. Shake well, and let the mixture stand for twenty-four hours, when it will be fit for use.

The value of this liniment depends greatly upon the fineness to which the corrosive sublimate is pulverized. Grind it as fine as possible in a druggist's mortar; pounding with a hammer will not answer. The object of this pulverization is to get the substance in such a form that it will be readily dissolved by the turpentine. There are comparatively few liquids which will dissolve corrosive sublimate, and we claim to have discovered that turpentine is one of these. Corrosive sublimate is well known as one of the most violent poisons. Its combination with turpentine constitutes one of the most powerful of medicines, increasing in its active properties by keeping. We believe it to be the most penetrating liniment in the world. It reaches the seat of disease through any and all obstacles. It destroys all infection, putridity, ulceration, old running-sores, proud flesh, and all skin and bone diseases of the horse. It will cure big head and jaw, grease, thrush, scratches, swelled legs, hoof-rot, foot-evil, corns, ulceration of the foot, (navicular disease,) fistula, poll-evil, ring-bone, and spavin, in their first stages.

In the human subject this liniment has been known to cure repeatedly those troublesome affections known as tetter and scald-head; but it is to be used with great caution in these cases, and not at all unless at least ten days old.

Method of using.—Always shake the bottle well before taking out the stopper. Pour the liquid into an earthen vessel, as it corrodes vessels of metal. Apply with a little mop of soft rag. In all bone affections the liniment is to be thoroughly dried in by means of a hot iron, held close to the medicated spot, but not close enough to burn the animal. Particular directions are given, in connection with the description of diseases, how to proceed in reference to quantity and manner of using the liniment.

Cautions.—Keep the materials for making this preparation and the medicine itself out of the way of children. Taken internally it is a violent poison, but may be antidoted by the white of eggs. It will not hurt the hands provided the skin is whole and sound. It is so corrosive that persons unacquainted with its use are sometimes alarmed at the severity with which it acts upon the skin of the horse. Nothing more strikingly shows the difference between the constitution of the horse and that of the human being than the action of this medicine, which, while it dreadfully inflames, corrodes, and puffs out the skin of the former, harms that of the latter not at all.

MAY-APPLE LINIMENT.

II.

Make a strong decoction from about a gallon of May-apple roots, continuing to boil until you obtain a thick syrup—taking care not to burn it. While still boiling, add one-fourth as much old bacon or lard as you have syrup, remembering to stir all the time; remove from the fire, and preserve for use.

Use.—We use this liniment in cases of ulcers and tumors where matter has formed. It is also employed in cases of fistula and poll-evil in their second stage; that is, when suppuration or festering has set in. In this stage of those diseases this remedy never fails to cure. It is slow in its action, but very certain if properly used. It inflames the skin, puffing it out like a honey-comb, and draws the fever and matter all to the surface.

To find the May-apple.—The May-apple (podophyllum peltatum) is common in the Middle and Western States of the Union. It grows in nearly all rich upland where the birch and the sugar-tree is found, and in most creek and river bottoms. It is about a foot in height, with a rounded stem, sometimes dividing at the top into two branches, between which is the flower. When not divided, the leaf at the top looks somewhat like a little umbrella. The roots are brittle, whitish-brown in color, and begin to branch within about an inch of the top of the ground, forming a dense bunch. The May-apple comes up early in the spring, and the stem dies down about June. The roots should not be dug up and dried, as drying destroys much of its medical efficacy. It can nearly always be found.

MAGIC NERVE LINIMENT.

III.

Get a strong bottle, capable of holding eight ounces, into which put

Spirits of hartshorn	1½ oz.
Sulphuric ether	1½ oz.
Spirits turpentine	½ oz.
Sweet oil	¾ oz.
Oil of cloves	½ oz.
Chloroform	1 oz.

Shake well and your liniment is ready for use. The bottle should be kept well closed, with a ground glass stopper, if possible, as several of the ingredients of the mixture are highly volatile. It should be kept in a dark place, or else closely wrapped in thick paper or cloth, as light tends to destroy its power.

Use.—This liniment, as its name implies, is applied for nervous affections, and is very soothing in its effects. It allays the pain in cases of string-halt, cramps, contraction of the skin, sprains, and swelled legs and joints. It is used as a counter-irritant to rub over the region of the throat in colds, coughs, swelled throat, etc.; the lungs in bronchitis,

pneumonia, and pleurisy; the stomach and bowels in colic and enteritis; the back and loins in all affections of the kidneys and urinary organs. It is also excellent to apply to the region of the brain in all cerebral disturbances. If applied early enough it will cure tumors and other swellings.

This liniment will be found of exceeding value to the human subject in various nervous affections, especially in headache and toothache.

MERCURIAL SALVE.

IV.

Take of metallic mercury (quicksilver) a quantity equal in size to a pea; of iodine, the same amount; of corrosive sublimate, one ounce, finely pulverized. Mix these with two table-spoonfuls of lard until thoroughly combined.

Use.—This salve will cure thrush, scratches, and foot-evil, but will *not* cure the other diseases of the foot. It will cure nearly all cutaneous diseases, such as mange, surfeit, etc., and all eruptions. It is not so powerful as the corrosive liniment, and, therefore, better than this in cases requiring mild treatment. It should be well rubbed into the skin with the end of the finger, or a rough rag or brush. Care should be taken in using this salve to keep it from the finger nails, as it corrodes and sometimes destroys them entirely.

SULPHUR OINTMENT.

V.

Take half an ounce of red precipitate, one ounce of sulphur, and four ounces of lard; mix well together and preserve for use.

Use.—This ointment is used to kill vermin on the horse, and to anoint the skin in such diseases as surfeit, mange, and all dryness and eruptions of the skin. It is a disinfectant for these diseases, as well as for all diseases of the feet and legs, such as thrush, grease, scratches, and foot-evil. It is good for slight galls on the back and shoulders. It is, on the whole, an invaluable remedy, and should be kept in every stable.

CAUSTIC SALVE AND WASH.

VI.

These are made of the common caustic potash of commerce. The wash is simply a strong solution of lye of potash and water.

Use.—For the cure of warts of different kinds, the lye is to be applied in the morning, then washed off in the evening, and the application repeated. This is to be continued until the wart is driven away. In the treatment of a blood wart, the corrosive liniment should follow the use of the potash, to destroy the roots of the wart and heal the sore. If a seed wart, grease the place after using the potash, and let it go. Care must be taken, in using caustic potash, not to let it run on other parts of the skin than that under treatment, as it will invariably remove the hair and cause a sore. This may be prevented by spreading a coat of grease below the wart on the skin.

The caustic salve is made by mixing finely-pulverized charcoal with the lye. This is used in the same manner as the wash, but it is to be preferred, because there is no danger of its running.

PROF. DALE S PERSIAN HORSE AND CATTLE POWDERS.

VII.

A very excellent tonic and alterative, to be used according to directions given in different parts of this work.

NITRIC ACID.

VIII.

Nitric acid is also used to destroy warts, but must be handled with extreme caution. A piece of leather or thick pasteboard, with a hole cut in it large enough to allow the top or crown of the wart to pass through, is first placed over the wart, and then a very little of the acid carefully applied with a very small brush or a little mop. The parts below the wart should be well greased with tallow to prevent the corrosive action of the acid which might trickle down. The application of the acid should be made every twelve hours,

until the wart is destroyed. The use of the corrosive liniment should invariably follow the last application of the acid.

Caution.—Nitric acid is a violent poison, and, if dropped upon the human skin, stains if it does not blister and produce malignant sores.

DISTEMPER MIXTURE.

IX.

Take one table-spoonful of gunpowder, one of hog's lard, one of soft soap, two of tar, one of gum myrrh; mix well together, and the quantity will suffice for six doses for a grown horse or ten for a colt. Its daily use will keep the glands open and running during attacks of distemper. Directions for its use have been given in the section on distemper. No danger is to be apprehended from using it freely.

EYE WASH.

X.

Take three hen's eggs and break them into a quart of clear, cold rain-water. Stir until a thorough mixture is effected. Boil over a slow fire, stirring every few minutes. Add half an ounce of sulphate of zinc (white vitriol); continue the boiling a short time, and the compound is ready for use. In this preparation a solid substance or curd is precipitated or thrown down, and a liquid solution rests upon the top. This liquid is the best wash for the sore eyes of either man or beast that was ever made.

The curd applied to the inflamed eye at night will draw the fever and soreness nearly all out by morning. It may be applied to the eye of the horse by fixing a hood over the head, leaving a hole for the accommodation of the sound eye, but fitting tight over the sore, so as to confine the curd to it. About a table-spoonful of the curd should be confined in a thin piece of muslin, and laid upon the lids, wet and dripping from the water, and bound fast. After two or three days, the water should be strained from the curd and put into a bottle for future use. It is well to strain the

water two or three times, so that it may be entirely clear and free of the egg ointment, and then it will keep perfectly good. The curd is of no future use. This eye-wash is invaluable. No physician or druggist has ever discovered a medicine of the kind equal to it, and it is claimed by the author of this work as his exclusive invention. When applied to the human eye it should be diluted. The curd may be used by the human subject with great efficacy.

JIMSON-SEED.

XI.

The Datura Stramonium, familiarly known as the jimson-weed, or thorn-apple, is a well-known poisonous plant, growing in rubbish in waste places. Its seed is used as a horse medicine; for, though poisonous to man, it is often beneficial to beasts. The only danger in giving it to the horse is, that it may injuriously affect his eyes; and yet horses have almost lived upon it for weeks and months, and no harm has followed. Cattle, sheep, and goats feed upon it with impunity. For the horse it is a most powerful alterative. It is cathartic, diaphoretic, and diuretic. It acts upon the stomach and bowels, producing a healthy condition of those organs. It enters the blood rapidly, finds its way through the capillaries to the surface, producing energetic and healthy cutaneous evacuations. Nothing that can be given the horse will so quickly regulate and allay urinary obstructions and inflammation. It is the great horse medicine. In cases of big head, hide-bound, stiff complaint, mange, farcy, glanders, distemper, and chronic founder it is unsurpassed. In all cases of impure and disordered and impaired digestion it is *the* medicine of all medicines. Nothing that we have ever used acts so promptly and beneficially. The big head can not be successfully cured without it; neither can bad cases of hide-bound and stiff complaint. Perhaps there is nothing that will relieve rheumatism as speedily as this seed. It should be gathered during the months of October and November and laid up for use.

Dose—From one to two ounces, or table-spoonfuls, every second or third day, according to the severity of the disease, until four doses have been given; after a lapse of a few days, repeat the operation. In extreme cases, a dose may be given every day.

SULPHUR.

XII.

Sulphur, as a horse medicine, has peculiar and valuable properties. It is alterative, mildly cathartic, and disinfectant. It destroys putridity of the bowels sooner than any other medicine, and acts very finely upon the absorbents. It is somewhat sedative, and most certainly diuretic. But it is most valuable in its action upon the skin and hair. It opens the pores and stimulates the oily secretions to press to the surface. It may be given in any quantity without injury to the horse. The usual dose is two ounces every day, or four ounces every other day. We use sulphur in the form of flowers.

ROSIN.

XIII.

Rosin, or resin, is a mild diuretic, and on that account is very valuable, as there are so many diuretics that are injurious to the horse from their energy of operation. Two table-spoonfuls is a dose. We always give it finely pulverized, and in connection with sulphur. It acts upon the kidneys and bladder, and cleanses the urine more safely and effectually than any other medicine we know of, but is very slow in its operation.

SCAB FROM THE HORSE'S LEG.

XIV.

The scab which grows upon the outside of both fore and hind legs of the horse has some very strange properties that have not heretofore been pointed out. It certainly has a very stupefying effect upon the horse when its odor is inhaled by him—when it is taken into his stomach or even put into his ears. The strange effect continues for an hour or two. If the substance mentioned be taken into the stom-

ach in quantity of a tea-spoonful it relaxes the entire system in a few minutes, and is of great value in cases of lock-jaw. Its operation is perfectly astonishing. A tea-spoonful pulverized is a dose, and is to be given in connection with a large dose of salts. This scab has a peculiarly strong and somewhat offensive smell; but the horse appears to be fond of it; and if the hands be rubbed with it, and held under his nose, he will stand perfectly still, in seeming quiet enjoyment. He often puts his head down and rubs his nose against the scab, which, no doubt, has some pleasant and beneficial effect upon him. Nature has probably provided this substance to meet some of his wants or to relieve some of his sufferings. We are of the opinion that its use as a medicine in any quantity is decidedly injurious, and should be sparingly indulged. It has been used by some in breaking wild horses, in the first steps in catching and gentling. We have tried it for this purpose, and would most earnestly discourage its use.

GLOSSARY

OF

SCIENTIFIC AND TECHNICAL TERMS

USED IN THIS WORK.

ABATE—To lessen, to diminish.

ABDOMEN—The belly; that part of the body which contains the stomach and intestines.

ABNORMAL—Unnatural, irregular.

ABORTION—A premature birth; miscarriage; an incomplete formation.

ABRASION—A tearing or rubbing off, as of a piece of skin.

ABSCESS—A cavity containing pus, or the pus in such cavity.

ABSCISSION—A cutting away or removal.

ACCRETION—A growing or increase.

ACENI—Small stones in the liver resembling berries of the same name.

ACME—The height of a disease.

ACRID—Pungent, irritating.

ACUTE—Sharp, severe; applied to diseases that soon come to an end as opposed to *chronic* diseases.

ADHESION—A union of parts; sticking together.

ADIPOSE—Belonging to, or consisting of fat.

AFFECTION—Disease.

ALBUMEN—A substance found in animals and vegetables, of which the white of an egg is an example.

ALIMENT—Any kind of food.

ALIMENTARY CANAL—The whole passage through which the food passes from the mouth to the anus.

ALKALI—A substance which neutralizes acids, as soda, potash, ammonia, etc.

ALTERATIVE—A medicine which gradually produces a change in the constitution.

ANATOMY—The science which teaches the structure of animals and plants, as learned by dissection.

ANOMALY—Irregularity; something out of the usual way.

ANTIDOTE—A remedy to counteract poisons or any thing noxious.

ANUS—The fundament or lower extremity of the bowel.
APERIENT—Opening, laxative.
AQUEOUS—Watery; consisting of, or having the properties of water.
ARTERY—The name of blood-vessels which carry blood from the heart.
ARTICULATE—To join together. Applied to the bones.
ASTHENOPIA—Weakness of vision.
ASTRINGENT—Binding or contracting.
ATTENUATE—To make thin.
AURICLE—The external part of the ear; also a part on each side of the heart, so called from resembling the ears of animals.

BISECT—To divide into two equal parts.
BRONCHIAL—Belonging to the divisions of the windpipe.
BILIARY—Belonging to, or containing bile.

CALCAREOUS—Like lime.
CALLUS—A hard deposit; excess of bony matter.
CAPILLARY—Hair-like. Applied to the extreme ramifications of the blood-vessels.
CAPSULE—A membranous bag inclosing an organ.
CARIES—Ulceration of the substance of bones.
CARTILAGE—Gristle.
CATARRH—A cold, attended with running of the nose.
CASTRATE—To emasculate; to deprive of the testicles.
CATHARTIC—Purgative.
CAUSTIC—Burning, as potash.
CAUTERIZE—To destroy animal tissues by heat, as with a hot iron.
CEPHALIC—Pertaining to the head.
CERVICAL—Belonging to the neck.
CEREBRAL—Pertaining to the brain.
CHIRURGICAL—Pertaining to surgery.
CHRONIC—Seated; of long continuance.
CHYLE—The milky liquid prepared from the food, to be absorbed by the lacteal vessels, and supplied to the blood for nutriment.
CHYME—The pulpy mass formed by digestion of the food in the stomach.
CICATRISE—To heal a wound, or induce the formation of a scar.
CLYSTER—A liquid substance injected into the lower intestine.
COAGULATE—To turn from a fluid to a thick state.
COFFIN-BONE—The lower bone of the leg incased in its hoof.
COITION—Copulation; sexual commerce.
COLIC—A painful disorder of the intestines.
COLLAPSE—A falling together.
COLON—One of the large intestines.
CONGENITAL—Born with; belonging to from birth.
CONGESTION—An accumulation of blood or other fluid in the vessels.
CONSTRICTOR—A binder or drawer together. Applied to the muscles.
CONTAGIOUS—Capable of being communicated by touch.

CONTORTED—Twisted.
CONTUSION—A bruise; the act of beating or bruising.
CORROSIVE—Having the power of gradually eating or wearing away.
CRANIAL—Pertaining to the skull.
CRUCIAL—Like a cross.
CRURAL—Of, or belonging to the leg.
CUL-DE-SAC—A passage closed at one end.
CUTANEOUS—Pertaining to the skin.
CUTICLE—The outer or scarf skin.
CYST—A small bladder or bag.

DECOCTION—A fluid impregnated with any substance by boiling.
DEGLUTITION—The act of swallowing.
DEGENERATE—To grow worse or inferior.
DECARBONIZE—To free from carbon.
DELETERIOUS—Destructive, injurious, poisonous.
DEPLETION—Emptying; diminishing the quantity contained.
DERMAL—Belonging to the skin.
DESSICATE—To make dry.
DETERGENT—Cleansing.
DIABETES—An inordinate flow of urine.
DIAGNOSIS—The distinction of one disease from another.
DIAPHORETIC—Increasing the flow of perspiration.
DIAPHRAGM—The midriff, or membranous and muscular partition which divides the thorax, or chest, from the abdomen.
DIARRHEA—An excessive discharge from the bowels.
DISINFECT—To purify from infection.
DIURETIC—Increasing the flow of urine.
DORSAL—Pertaining to the back.
DRASTIC—Acting powerfully.
DUCT—A tube or vessel for conveying a fluid, especially a secretion from a gland.
DUODENUM—The first portion of the small intestine.
DYSPHAGIA—Difficulty of swallowing.
DYSPNŒA—Difficulty of breathing.

ECCHYMOSIS—An effusion of blood under the skin; a bruise.
EJECTION—A casting out.
ELASTIC—Having the property of springing back to its original form after this has been altered.
EMETIC—Producing the act of vomiting.
EMOLLIENT—Softening or relaxing.
ENEMA—A medicine injected into the lower bowel.
ENTERIC—Belonging to the bowels.
EPIGLOTTIS—A tongue-shaped projection lying over the entrance of the windpipe, and preventing the entrance of food or drink.
ERUPTION—A breaking forth; a rash on the skin.

Esophagus—The gullet or tube which conveys food to the stomach.
Evacuate—To empty or free from.
Excoriate—To strip off the skin.
Excrement—Refuse matter.
Excrescence—An unnatural or superfluous growth.
Excretion—A separation of fluids from the body by means of glands.
Exhalant—Breathing out or evaporating.
Exostosis—An unnatural growth of or projection from a bone.
Exude—To discharge through pores.

Facial—Pertaining to the face.
Fœces—Excrement, or refuse matter.
Farcy—A disease of the lymphatics of the skin of the horse.
Feculent—Containing dregs or sediment.
Femur—The thigh bone.
Fermentation—Commotion owing to decomposition of vegetable substances souring.
Fetus, or Fœtus—The young unborn animal, in which all the parts of the body are formed.
Fibrin—An organic substance found in the blood, and composing a great part of the tissues of the body.
Fibula—The small or splinter bone of the hind leg above the hock.
Fistula—A deep, narrow, callous ulcer.
Fistulous—Like a pipe.
Flatulency—A generation of gases in the stomach and intestines.
Flexible—Capable of being bent.
Flexor—A bender. Applied to the muscles which bend the limbs.
Fumigate—To apply smoke or vapor.
Fungous—Resembling mushrooms.

Gangrene—Death of a limited portion of the body or of any of its tissues.
Gas—A fluid in the form of air.
Gastric—Pertaining to the stomach.
Gelatine—Animal jelly.
Genital—Relating to reproduction or generation.
Gland—A structure for the purpose of secreting or separating some particular material.
Glottis—The narrow opening at the top of the windpipe.

Habitat—The natural abode or locality of an animal.
Hæmal—Relating to blood.
Hæmatin—The coloring matter of blood.
Hemorrhage—An escape of blood from the vessels.
Haw—An organ in the eye of the horse that throws the washer over the eye.
Haunch—The hip; the upper part of the thigh bone.
Hepatic—Belonging to the liver.

HEPATIZED—Turned into a substance resembling liver.
HEREDITARY—Acquired from ancestors; transmitted from parent to offspring.
HUMERUS—The upper bone of the fore-leg.

ILEUM—The lower portion of the small intestine.
INCISION—A cutting into; a cut.
INFECTION—The communication of disease by means of the miasma or emanation from a diseased body.
INGESTED—Things taken in. Applied to food.
INJECT—To throw in.
INDURATION—Hardening.
INTERSTICE—A small space between the particles of a body.
INTESTINES—The alimentary canal from the stomach to its termination.

JEJUNUM—A part of the small intestine.

LACHRYMAL—Pertaining to tears.
LACTEAL—Conveying milk, or a fluid like milk. Applied to the vessels which take up the chyle from the alimentary canal and convey it to the thoracic duct.
LARYNGITIS—Inflammation of the larynx.
LARYNX—The enlarged upper part of the windpipe extending into the throat.
LAXATIVE—Loosening; mildly purgative.
LESION—Any hurt or injury; disease of structure.
LIGAMENT—That which bends together; a fibrous structure connecting bones.
LIGATURE—A band; the act of binding; a cord or string used for tying blood-vessels.
LOBE—A part or division of an organ, as of the brain, lungs, or liver.
LYMPH—A transparent and nearly colorless fluid which is conveyed into the blood by the lymphatic vessels.

MALADY—Disease, distemper, ailment.
MALAR—Pertaining to the cheek bone.
MEDIASTINUM—The partition formed by the meeting of the pleura dividing the chest into two lateral parts.
MEMBRANE—An animal tissue expanded into a thin layer.
MESENTERY—The fold, or membrane, which attaches the intestines to the spine.
METASTASIS—A transference of diseases from one place to another.
MOLAR—Grinding. Applied to the large double-teeth with which the food is ground.
MORBID—Relating to disease; diseased.
MUCUS—The slimy substance effused on the surface of the membranes covering the inner surface of the body.
MUSCLE—An organ by which the active movements of the body are produced; the lean meat.

NASAL--Belonging to the nose.
NAUSEA—A disgust for food, with inclination to vomit.
NAVICULAR—A bone in the foot shaped like a boat.
NEPHRITIS—Pain or inflammation in the kidneys.
NERVE—A bundle of white fibers, whose office it is to convey sensations to the brain.
NORMAL—According to rule; regular.
NUTRITION—The process by which animals appropriate to their repair or growth materials taken from external substances.

OBESITY—Excessive fatness.
OCULAR—Relating to the eyes.
OMENTUM—The caul; a fold of the peritoneal membrane covering the intestines in front.
OPTIC—Relating to the eye, to sight, or to the laws of vision.
ORGAN—A natural instrument by which some process or function is carried on.
OSSEOUS—Formed of, or resembling bone.
OSSIFY—To form bone; to become bone.

PABULUM—Food.
PACHYDERMATA—Thick-skinned animals, as the horse.
PALATE—The roof of the mouth.
PANACEA—A medicine supposed to cure all diseases.
PANCREAS—A narrow, flat gland extending across the abdomen, known familiarly as the callet, or sweet bread.
PAROXYSM—A fit of any disease coming on after a period of intermission.
PARTURITION—The act of bringing forth young.
PATELLA—The knee-pan.
PATHOLOGY—The branch of medical knowledge which treats of the nature and constitution of disease.
PECTORAL—Relating or belonging to the breast.
PEPTIC—Promoting digestion.
PERICARDIUM—The serous membrane around the heart.
PERICHONDRIUM—The membrane covering the cartilages.
PERICRANIUM—The membrane lining the bones of the skull.
PERIOSTEUM—The fibrous membrane which invests a bone.
PERITONEUM—The serous membrane which lines the cavity of the abdomen.
PERMEATE—To pass through without rupture or apparent displacement.
PHARYNX—The muscular tube at the back part of the mouth which leads to the gullet.
PHLEBOTOMY—The act or art of blood-letting.
PLASMA—The colorless part of the blood.
PLETHORIC—Having a full habit of body.
PLEURA—The serous membrane which lines the interior of the chest and covers the lungs.
PLEXUS—A net-work of vessels.

PROCESS—A prominence, or projecting part.
PROGNOSIS—The art of judging of the course and event of a disease by the symptoms.
PROLAPSUS UTERI—A falling of the womb.
PROLAPSUS RECTI—A falling of the rectum.
PULMONARY—Relating to the lungs.
PULSATE—To beat, or throb.
PURGATIVE—Having the power of cleansing.
PUS—A peculiar fluid yielded from the blood in consequence of inflammation.
PYLORUS—The part of the stomach through which the food passes to the intestine.

QUIESCENT—Being at rest; having no sound.

RABIES—The disease known as hydrophobia.
RACHITIS—Inflammation of the spine; rickets.
RAMIFY—To make branches.
RAPHE—A term applied to parts that look as if sewed together.
RAREFY—To make or become thin.
RECEPTACLE—That which receives or contains.
RECTUM—The last part of the large intestine.
REMITTENT—Ceasing for a time.
REPRODUCTION—The art or process of producing again.
RESPIRATION—Breathing.
RETINA—The part of the eye upon which the image is formed in the act of vision.
RICKETS—Diseased state of the bones.

SACRAL—Belonging to the os sacrum.
SALINE—Salty.
SALIVA—The spittle or secretion of the salivary glands.
SANGUIFICATION—The making of blood; the process by which blood is produced from chyle.
SANITARY—Relating or conducing to the preservation of health.
SCIATICA—A painful rheumatic affection of the hip.
SCLEROTIC—Hard; a name given to the thick, white, outer coat of the eye.
SECRETE—To separate some peculiar substance from the blood.
SENSORIUM—The seat of sensation; the organ which receives the impressions.
SEPTIC—Promoting putrefaction.
SERUM—The yellowish fluid which is left after the coagulation of blood.
SHANK—The bone of the leg from the knee to the ankle.
SLOUGH—To fall off; to separate by disease.
SPINAL—Belonging to the spine, or back-bone.
SPLINT—A hard excrescence on the shank-bone—one of the bones of the hind leg.
SPORADIC—Separate; scattered.
STERNUM—The breast-bone.
STRANGULATED—Choked; having the circulation stopped in any part.
STYPTIC—Astringents; having the property of restraining bleeding.

SUDORIFIC—Causing sweat, or perspiration.
SUPPURATION—The process of the formation of pus as a result of inflammation
SYNOVIA—A fluid resembling the white of an egg, secreted in the cavity of joints for the purpose of moistening them.

TEGUMENT—A cover or covering—usually the skin.
TENDON—The dense, fibrous structure in which a muscle ends, and by which it is fastened to the bone.
TENUITY—Thinness.
TERGAL—Belonging to the back.
TESTICLE—The glands which contain the seminal fluid.
THERAPEUTIC—Healing; pertaining to the art of healing.
THORAX—The chest, or part of the body between the neck and the abdomen.
TIBIA—The largest bone of the hind leg.
TONSIL—An oblong gland situated on each side of the fauces, or posterior part of the mouth.
TORTION—Twisting.
TRACHEA—The windpipe.
TRACTILE—Capable of being drawn out.
TUBER—A rounded projection of a bone.
TUMOR—A permanent swelling or enlargement.

ULNA—The upper bone of the fore-leg.
URINARY—Pertaining to the urine.

VASCULAR—Belonging to or consisting of vessels.
VENESECTION—The operation of letting blood by opening a vein.
VENTRAL—Pertaining to the belly.
VENOUS—Pertaining to the veins.
VERTEBRA—A divison or separate bone of the spinal column.
VESICLE—A small blister; any small membranous cavity.
VIRULENT—Very poisonous.
VIRUS—Poison; the essential matter of a disease that is capable of communication.
VISCERA—The organs contained in the cavities of the body.
VISCID—Gluey, glutinous, sticky.
VULNERARY—Useful in healing wounds.

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TABLE OF SYMPTOMS

TO

FACILITATE THE DETECTION OF DISEASE.

The subjoined table presents a classified view of the principal diseases to which the horse is subject, together with brief summaries of the symptoms of those disorders the nature of which is not clearly expressed in the name. The symptoms are arranged in the order in which they usually manifest themselves in the patient, and thus indicate the different stages of the disease. The numbers indicate the pages upon which the various diseases are fully discussed:

DISEASES OF THE BONES.

(Page 69—99.)

Big Head – Swelling of under jaw and nasal bone, and afterward of other bones of the head; skin and muscles of the head become fixed, and will not move by pulling the lips; constant sleepiness while standing; gaunt appearance, drooping of head, placing hind and fore-feet near together, watery eyes, erect hair, stiff joints, dry skin; excrement hard and dry..... 69

Swinney, or Inflammation of the Shoulder.—Inflammation, heat, lameness in the shoulder; step, short and limping; flesh, hard: skin, closely adherent to the bone; shoulder becomes shrunken and shriveled; patient reluctant to lie down; finally, shoulder-blade descends, humerus joint swells, and the disease becomes incurable. Swinney is usually accompanied by diseased feet, especially hoof-rot..... 84

Big Shoulder.—Aggravated Swinney. (See preceding paragraph.)..... 87

Swinney of the Hip..... 88

Slipped or Broken Hip..... 88

Bone Spavin.—Enlargement upon the inside of the hock, just below the joint..... 89

Enlarged Hock..... 93

Broken Hock..... 94

Ring-bone.—Bony enlargement around the lower joint of the hock where the hoof and hide join. Ring-bone in its worst form becomes club-foot..... 94

Stifle.—Swelling at the stifle-joint, producing lameness..... 95

Splint.—Enlargement of the inner splint-bone, like Spavin..... 96

Broken Knees..... 97

Sway Back..... 98

DISEASES OF THE FEET.

(Page 100—117.)

Ulceration of the Foot, or Navicular Joint Disease.—Occasional limping, as if pricked by a nail; ulceration of Navicular bone, or else slow decay; hoof shrinks; portions toward the back of the foot drawn together; bone enlarges, as in Spavin and Ring-bone; Navicular bone adheres to lower pastern and coffin-bone, the three finally uniting and swelling inordinately..... 100

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Hoof-rot.—Tenderness of foot; dry, chalky-looking substance formed in bottom of foot; frog, diminished in size; ankle-joint, swollen; step, short and limping..... 107

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Contraction of Hoof, or Narrow Heel..... 111

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Founder.—Restlessness and frequent shiftings of the fore-feet; pulse, quick

and strong; nostrils red and florid; expression, anxious and wo-begone; grunting and restlessness; frequent lying down and getting up; fretful change of position; rising upon the haunches; placing the nose upon the feet..... 113

DISEASES OF THE GLANDS AND NASAL MEMBRANES.

(Page 118—163.)

Blind Staggers.—Real or apparent blindness, generally of one eye, sometimes of both; running constantly round and round in a circle, the circumference of which is about sixty feet; deafness; occasional fits of staggering, pitching, and reeling, lasting from twenty minutes to an hour, spasms increasing in frequency and violence; rearing, plunging, groaning, convulsions, and mad plunges of indescribable violence..... 118

Glanders.—Running of the nostrils, usually beginning with the left; the secretion aqueous and somewhat sticky, increasing in quantity and stickiness with the progress of the disease, and growing yellowish white instead of transparent; long, stringy clots hanging and dripping from the nose; nasal membrane pallid or of a leaden hue; ulcers form in the nostrils; secretions become darker, and are flecked with blood; loss of flesh and hair; cough, difficult breathing, tenderness about the forehead; tumors, first about the head and face, and then over the body generally..... 129

Farcy.—Similar to last stages of glanders, above described. Ulcers on the skin, discharging a fluid, at first watery and yellow, afteward purulent, bloody, and very offensive. These ulcers first appear upon the legs, neck, and shoulders, and often extend till they cover the entire body..... 152

Distemper.—Dry, hacking cough; running of the nose, the discharge being first watery, afterward thick, purulent, and whitish in color; swelling under the throat; abscess often formed in the throat; high fever; hard pulse; loss of appetite and flesh; occasional abscess on the belly, near the sheath..... 158

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DISEASES OF THE EYE.

(Page 164—183.)

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Cataract 177

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DISEASES OF THE MUSCLES AND TENDONS.

(Page 184—215.)

Fistula.—Swelling of the *serratus major*, forming an abscess; blood, thick and black; pulse, very full; sometimes caries of cartilages and sinking of the tissues 184

Poll Evil 190

Bog and Blood Spavin.—Puffy swelling under the skin, and cellular tissue of the hock-joint 192

Wind-galls.—Puffy swelling below the knee and hock and on the ankle. 194

Curb.—Enlargement on back of leg 197

Thorough-pin.—A watery enlargement on the back of the hock-joint, inside the *os calcis* 197

Tetanus, or Lock-jaw.—Rigidity of muscles; stiffness of joints; protrusion of muzzle; immobility of ears; dilatation of nostrils, with little or no play; eye withdrawn deeply in socket; haggard, horror-struck expression of countenance; tucking up of belly; straddling posture of legs; and jaws firmly closed. 198

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Rheumatism.—Inflammation of tendons and joints, especially of the hips and shoulders 206

Spasms—Of the muscles—Violent contraction of muscles, causing sudden jerks 211

do. Of the nerves—Agitation, trembling, and a wild and frightened look 211

String-halt, or Spring-halt.—Whenever the horse lifts his legs, it is caught up much higher than usual, with a sudden, spasmodic jerk 212

DISEASES OF THE SKIN AND EARS.

(Page 216—245.)

SCRATCHES.—Thick, dry, scabby covering of the skin, coming in little patches on the heel, which spread until they become one solid mass of scab and matted hair; itching of the parts..... 216

THRUSH.—Discharge of very offensive matter from frog and heel..... 218

CRACKED HEEL, OR GREASE.—Symptoms like those of Thrush, but confined to the heel..... 219

SWELLED LEGS.—Inflammation of cellular tissue of legs, causing swelling; puffing out of the skin; lameness; stiffness of the joints; after a time cracks appear, from which exudes a whitish-yellow, watery matter..... 223

SWELLED ANKLES.—Swelling of ankle-joints..... 226

SURFEIT.—Pustules on the skin, from the top of which exudes a thin, whitish, oily matter, forming scabs on the shoulders, neck, sides, and back part of fore-leg..... 228

MANGE.—Falling off of the hair; skin dirty brown, loose, and flabby; scabby eruptions on skin; peeling off of cuticle, leaving the parts beneath raw and bleeding; burning and itching..... 229

HIDEBOUND..... 233

STIFF COMPLAINT.—Skin dry and contracted; joints stiff; muscles and tendons of legs become stiff, and fairly seem to contract..... 234

WARTS.—Seed warts are small tumors on the eyelids, the nose, the sheath, and adjoining portions of the belly, having little hard points, or grains. Blood warts are spongy tumors, from which blood exudes on every slight irritation, usually on hock and knee-joints, and the pasterns. They have great tendency to spread; sometimes are very sore, raw, and bleeding..... 236

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SADDLE GALLS.—Back of horse chafed and raw. Sometimes tumors form, which discharge matter..... 240

Sore Ears.—Scabby or mangy eruptions on the tips of the ears, which spread downward..... 243

DISEASES OF THE BRAIN AND NERVOUS SYSTEM.

(Page 246—259.)

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Apoplexy.—Giddiness and wildness of motion, and a staggering gait; profuse sweating; trembling, especially of the knees; a wild and wistful look; twitching of the skin and jerking of the ears..... 247

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Fits, or Epilepsy.—A wild, fierce look; rearing and pitching; nervous twitching and convulsions..... 253

Phrenitis, or Inflammation of thn Brain.—Patient drowsy, stupid; his eye closes; he sleeps while in the act of eating, and dozes until he falls; pulse, slow; breathing, laborious..... 253

Palsy.—Hips and thighs partially or entirely paralyzed..... 256

Insanity.—A stupid manner; wandering expression of countenance; uncontrollable alarm at sudden noises, colors, etc..... 257

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Decay of Teeth.—Toothache, indicated by the sudden dropping of the corn from the horse's mouth. Stump-sucking, crib-biting, and wind-sucking may be referred to this cause..... 266

Scurvy of the Teeth.—Front teeth covered with ridges of white scurf, which inflame the jaws..... 268

Stump-sucking, Crib-biting, and Wind-sucking..... 270

LAMPAS.—Swelling of muscles of front part of the mouth; the muscle next to the front teeth swells until it extends below them, and is very sore. Lampas usually accompanies teething..... 274

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LARYNGITIS.—Violent coughing, attended by gurgling; breathing, short and quick; membrane of nose red; horse shrinks when the larynx is pressed upon; paroxysms of coughing become more frequent; head projected; neck stiffened; considerable swelling in throat, and difficulty of swallowing; as inflammation increases, the cough becomes hoarse and feeble..... 283

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MALIGNANT EPIDEMIC.—Inflammation of mucous membranes of respiratory organs; diarrhea; acute fever, followed by great prostration; loss of appetite; staring coat; wandering look; staggering; continual lying down and rising again; gazing alternately at each flank; twitching of the skin, and spasms of limbs..... 285

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BRONCHITIS.—Swelled throat; increased rapidity of breathing; cough; discharge of a purulent mucous character, with clots of blood and plugs of matter from the nose; patient remains standing and motionless; breath, hot; pulse, full and rapid, beating 60 or 70 times a minute; membrane of nose, deep red; dry, rattling sound heard in throat and chest..... 296

Pneumonia, or Inflammation of the Lungs—Begins with a chill, succeeded by a fever; this repeated several times; extremities, always cold; breathing, hurried and distressed; pulse, quick; mouth and breath, very hot; painful cough; fore feet, wide apart; grinding of the teeth; weakness; staggering; struggling; groaning..... 298

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